The Journal

of the

American Pharmaceutical Association

INDEX TO VOLUME XXIII

INDEX TO AUTHORS
INDEX TO SUBJECTS

JANUARY TO DECEMBER, 1934

EVENTS OF PHARMACY IN 1933

(See Historian's Report November JOURNAL, page 1190)

The outstanding event of American Pharmacy is the completion of the Pharmacy building in Washington—the American Institute of Pharmacy— 'dedicated to those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy ' The site is beautiful—the building faces the Lincoln Memorial, the historic river and Memorial Bridge may be seen from the building, also, the Washington Monument and part of the dome of the Capitol

The Leadbeater pharmacy, in Alexandria, was purchased for the AMERICAN PHARMACEUTICAL ASSOCIATION an association in Alexandria hopes to purchase the building and maintain the old pharmacy as a museum if this Association is successful in raising sufficient funds, the fixtures, other articles and records will remain in Alexandria, otherwise these will be placed in the headquarters building

Pharmacy's exhibit at the Century of Progress" interested the public, and the visitors obtained a better understanding of the service of pharmacy, many pharmacists were registered and quite a number of them were from foreign countries

A symposium on Practicing Professional Pharmacy" was an outstanding feature of the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION

As all other activities, the drug industry is subject to codes applying to its several divisions The code applicable to Retail Drug Establishments and to all Retailers dealing in drugs and allied products will be found on page 1071 of the October JOURNAL A comment applying to pharmacists has been made by the Administration as follows

'The terms registered pharmacist,' assistant pharmacist' and 'apprentice pharmacist,' as used herein (Code) shall have the meaning given to them under the laws of the respective states of the United States and of Alaska

'A worker to be classified in this group must comply with the state law requirements for his position The separate classification of pharmacists and professional persons is not intended to reflect in any way upon the recognized standing of pharmacists "

Legislation in Congress is under discussion which seeks to amend the Food and Drugs Act or create a new law The AMERICAN PHARMACEUTICAL ASSOCIATION adopted the following resolution at its Madison meeting

"*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION records its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health, and be it further

'*Resolved* that in the interest of a sound public policy the delegation of arbitrary discretionary powers in connection with the enforcement of Food and Drug legislation be disapproved "

The reader is referred to the address of W G Campbell, Chief of the Food and Drug Administration in the October JOURNAL, page 1012, an editorial in the December JOURNAL , report on action by the Drug Trade Conference in the same number, page 1307

The ' Pharmaceutical Syllabus ' has been revised, revisions of the "United States Pharmacopœia" and of the "National Formulary" are progressing

The most important event in British pharmacy is the passing of the Pharmacy and Poisons Act Every person registered as a pharmacist, shall by virtue of being so registered, be a member of the Pharmaceutical Society of Great Britain

Pharmacy Week was held during the week of October 9th

L D HAVENHILL

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

Vol XXIII JANUARY, 1934 No 1

THE PRESIDENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

L D Havenhill, the thirty-third president of the American Association of olleges of Pharmacy, was born in the town of Big Grove, Kendall County, Illiois, April 5, 1870 His early education was obtained in the Kendall County rural hools and completed in the West Aurora, Illinois high school, from which he aduated in 1887

The years 1890–1891 were spent in gaining practical experience in an Iowa drug store He entered the University of Michigan School of Pharmacy in the fall of 1891 and a year and a half later passed the Michigan State Board of Pharmacy examination for registered pharmacist, but following graduation he accepted the invitation of Prof A B Stevens to remain as his assistant in pharmacy for the following year and to complete the work for the degree of Master of Pharmacy This work was completed in June 1894, in time to accept a position of assistant chemist for a year in Honolulu with Dr A B Lyons While there he made some of the first chemical analyses of the rich sugar cane lands of the island of Oahu Upon the completion of this work with Dr Lyons he spent several months in the laboratory of the government chemist, Dr Walter Maxwell Upon his return to the states he was employed for a time in a pharmacy in Aurora, Ill , but later became assistant chemist for the Chicago and Aurora Smelting and Refining Company

In the fall of 1899 he was appointed assistant professor of pharmacy at the University of Kansas, a position which he held until 1907 when he was granted a leave of absence to take a position as food and drug inspection chemist with the U S Department of Agriculture under Dr H W Wiley and Dr L F Kebler After a year at the appraiser's stores in New York City, he returned to the University of Kansas School of Pharmacy as professor of pharmacy and pharmaceutical chemistry Following the death of Dean L E Sayre, in 1925, he succeeded to the deanship

Dean Havenhill is a member of the Kansas Pharmaceutical Association

and is its librarian He is a member of the AMERICAN PHARMACEUTICAL ASSOCIATION (1890), the American Chemical Society and the Kansas Academy of Science, and has held important offices in each He is a member of the honorary scientifi society of Sigma Xi and the Gesellschaft fur Geschichte der Pharmazie He is a member of the Committee on Recipe Book and is serving his second decennial term on the Revision Committee of the U S Pharmacopœia

He is director of drug analysis for the Kansas State Board of Health and member of the referee committee on livestock remedies for the Kansas State Board of Agriculture He has contributed articles to various pharmaceutical journals and is the author of *Pharmaceutical Arithmetic*, 1912, *State Boards of Pharmacy Questions*, 1917, and co-author (with L E Sayre) of *Essentials of Pharmacy*, 1918

A WORD OF APPRECIATION

THE office of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the JOURNAL has been in Baltimore for the past eight years During this time the writer has received many courtesies and made quite a number of friendships which he hopes will continue for many years Baltimore is known for its hospitalities and has a good pharmaceutical history, its pharmacists represent not only the ideals of pharmacy, but the members of the profession give expression to their views important questions and seek to advance pharmacy and its service

It is hoped that the foregoing words are proper in this place, certainly, they are expressive of the writer's appreciation

OFFICERS-ELECT FOR 1934–1935

The Board of Canvassers of the AMERICAN PHARMACEUTICAL ASSOCIATION composed of W F Rudd, Chairman, W G Crockett and A L I Winne, all of Richmond, Va , has announced as the result of the mail ballot for officers of the ASSOCIATION, the election of the following

President, Robert P Fischelis, Trenton, N J
First Vice-President, George D Beal, Pittsburgh, Pa
Second Vice-President, Oscar Rennebohm, Madison, Wis
Members of the Council (for three years), H A B Dunning, Baltimore, Md , S L Hilton, Washington, D C , W Bruce Philip, Washington, D C

These officers will be installed at the next annual meeting of the ASSOCIATION which will be held in Washington, D C , the time to be announced later

Whether the alleged victim be the small industry or the small enterprise the effect of the national recovery program on its functioning should be studied with most assiduous fact-finding and fault finding The recovery undertaking cannot be expected to remove all the competitive disadvantages of small size, but it certainly must not be allowed to aggravate them '—*Paint Oil and Drug Reporter*

EDITORIAL

F G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

WE GREET 1934 WITH HIGHER HOPES

IN ENTERING a new year it is frequently the indulgence of the introspective to recall thoughts of past successes or linger on remembrances of evil days and bemoan prospects, based on deductions made by them The value of both depends on whether the aim is to "carry on "

The year enrolled on the records of time has been an eventful one, unexpectedly, hidden or unknown conditions were brought to light and the great majority met with difficulties, the Government, with natural wealth, economic productiveness, potentialities of material prosperity, had to deal with problems that obtain in countries we consider less fortunate than our own It was deemed necessary to apply methods to which the people of the United States were not accustomed, a study of them may bring the individual to conclusions, but in order to solve the problems it is necessary that all citizens do their part Viewing the conditions of the earlier months of the past year and comparing these with the later—there is evidence of progress True it is, that we have to submit to rules and regulations, methods and what not, many of which we do not understand, some prefer to —"most of us do not comprehend " The inconveniences are many and the average citizen is disturbed by expenditures that seem beyond the possibilities of ever being adjusted, but, despite all of this, the inextinguishable impulse of our people is to believe that this year will be better than the last, somehow, the memories of the mistakes and disappointments of 1933 will be shaken off and we greet 1934 with higher hopes

---

FOOD AND DRUG LEGISLATION IN CONGRESS

SENATOR ROYAL S COPELAND has introduced a revised food and drugs bill numbered S 2000, based on the former bill, S 1944 Many changes and additions have been made, among the latter, the creation of a Committee on Public Health and a Committee on Foods, each to consist of five persons appointed by the President "with a view to their distinguished scientific attainment and interest in public health" to assist the Secretary of Agriculture in preparing and amending regulations which must be approved by the majority of the appropriate committee Provisions have also been included for hearings on regulations and for court review by injunction proceedings, of promulgated regulations

Relative to labeling, the Copeland revision says "if its labeling is false or misleading in any particular, provided that no drug shall be deemed to be misbranded because of any representation concerning any effect of such drug if that representation is supported by substantial medical opinion or by demonstrable scientific facts " The "not a cure" provision in the definition of misbranded drugs has been entirely rewritten to require that the label show that the drug is a palliative and how and to what extent

Congressman Loring M Black, of New York, has introduced the bill of the National Drug Trade Conference to amend the present food and drugs act

The purposes of the Conference in preparing the amendment were set forth by Representative Black, They are, in part, as follows

1 Enlarge the definitions of the act so as to include devices and cosmetics

2 Extend its provisions to include advertising

3 Provide that notices of hearing shall be furnished to the manufacturer of the product, if known, and if unknown to the party who caused the article to be introduced in interstate commerce, instead of to the party from whom the sample was obtained, as provided in the present law

4 The provision relating to the United States Pharmacopœia and National Formulary is amended to provide that the article shall not be deemed to be adulterated if the finished product complies with the pharmacopœial or National Formulary standards, without regard to the manner in which such product may be manufactured

5 Cosmetics are deemed to be adulterated if they contain poisonous or deleterious ingredients in such quantities as are likely to be imminently dangerous to the user under prescribed conditions This in lieu of provisions of Senate 1944, which provide in effect that the cosmetic shall be adulterated in case there is any remote danger of injury to persons with an idiosyncrasy

6 The term, 'package' or ' original unbroken package,' is defined as that intended for delivery to the ultimate consumer—that is the retail package The Supreme Court of the United States (McDermott *vs* Wisconsin, 228 U S 115), has in effect indicated that under the present law such is the defined package of commerce

7 Label" and advertising" in the amendment proposed by the National Drug Trade Conference are in effect the same as in Senate 1944

THE PHARMACY AND POISONS ACT (GREAT BRITAIN)

THE British Pharmacy and Poisons Act became effective December 31st, under this Act every one (in Great Britain) at present registered as a "pharmaceutical chemist" or "chemist and druggist becomes a member of the British Pharmaceutical Society without any action having to be taken by him The annual registration fee is £1, 11s , 6d which includes a copy of *The Pharmaceutical Journal,* a provision, registering pharmacies, will come into force

We quote from an editorial comment in *The Pharmaceutical Journal* on the effects of the Act "though the Act does not contain all that could be desired, even though it falls short of the expectations of the mildly optimistic, it is a gigantic step in the right direction If it did no more than to compel every person engaged in the business of a chemist and druggist to bear his share of the cost of administration it would have been worth while The essential constitution of the Society (British Pharmaceutical) remains unaltered The Act strengthens not weakens the Society Pharmacy remains a self-governing calling, controlled by a Council elected on a democratic basis, fixing its own qualifications, setting its own standards of education, regulating its own method and right of entry The presence of three lay members—(the Privy Council may appoint three members of the Council and these need not, necessarily, be members of the Society)—will add to, rather than detract from, the powers of the Council "

Inspectors are provided for, anyone who is registered under the Act may be deprived of his certificate for misconduct

---

SCIENTIFIC SECTION

OXIDATION AND ANTIOXIDANTS *

BY A LEE CALDWELL AND FRANCIS E BIBBINS

One of the principal requisites of life, an indispensable, elemental necessity, is oxygen We live by oxygen's favor only to spend our time and effort in an attempt to abate or prevent the damage done by this same element Our food spoils and our property wastes away, in many instances due to the continual reaction which we know as oxidation The first antioxidants were no doubt completely physical in their prevention of oxidation, such as pickling solutions, liquids or resins which protected some substance from contact with air Our forefathers knew that their implements must be oil treated, lacquered or painted to preserve them, and we find that lacquer was used in China as a protective for buildings in the second century B C, and a definite record of lacquer manufacture in Japan dates about A D 587 The lacquer used was an oxidizable substance extracted from a tree, *Rhus vernicifera*, and first oxidized to a yellow substance and then to a black

An antioxidant is a substance which inhibits, prevents or stops the oxidation of some other substance or substances This action is thought to occur in several ways

By Inhibition—Where the oxidation reaction is prevented by a substance which naturally repels the absorption of oxygen or takes up the oxygen which would combine with the substance being protected

By Catalytic or Anticatalytic Action—In which the antioxidant is regarded as a negative catalyst or a catalyst operating against change in the substance to which it is added This catalytic action operates to cause a reaction to take some form other than the normal reaction with the principal substance involved

By Chain Reactions—In which the oxidizing reaction is viewed as one that starts and while going on gives off energy which in turn starts another reaction with the same results The antioxidants operate to break up these subsequent reactions and stop this recurring chain

These three conceptions while given here with titles to set them apart are not by any means entirely or distinctly different There is some variation in viewpoint but each of them involves more or less a very kindred action There are other theories which bear a connecting link between those just mentioned but are not sufficiently distinctive to continue to enumerate them

Moureu and Dufraisse (1) have done quite extensive work on the study of auto-oxidation with the viewpoint that every reaction is a catalytic one, and there seems to be no legitimate reason to doubt that all auto-oxygenic or antioxygenic actions can be viewed from this standpoint Whatever action takes place and by whatever means, it is easily resolved into one of catalysis That every antioxidant is one that can be oxidized is seemingly very safe ground, especially when one

* Scientific Section, A PH A, Madison meeting, 1933

considers that oxygen is oxidizable to ozone and acts as an inhibitor in the reaction between hydrogen and chlorine

About twenty or twenty-five years ago considerable interest was aroused among chemists over oxydase, an enzymatic ferment, which was held as the principal causatory agent of oxidation in all products in which it was existent Keegan (2) relates the observations of Lindet in 1893 regarding the oxidation of apple juice It was found that the juice from boiled apples did not discolor in the air while the juice from fresh apples, cut and washed thoroughly with boiling water, did discolor A conclusion was advanced that perhaps the vegetable tannin precipitated the oxydases In the light of what we now know it seems more probable, however, that in boiling, a chemical reaction was responsible for some change in a natural constituent either destroying a pro-oxidant or forming an antioxidant Such a conclusion has been reached by Overholser and Cruess (3) in their study of the browning of apples They concluded that a peroxydase and an organic peroxide were responsible, and definitely detected the peroxide in fresh apple juice and could find no evidence of it in the boiled juice

Lubimenko (4) observed, or detected, the formation of an antioxydase as a natural process during the ripening of the tomato

It is well known that the heating or boiling of oils increases their susceptibility to oxidation Especially is this practiced in the preparation of linseed oil, and in addition to boiling, traces of metals or metallic compounds have been added Pholin (5) classified the activity of fifteen metals according to their activity as follows *Group 1*—Cobalt, manganese, chromium, nickel, iron, platinum, palladium *Group 2*—Lead, calcium, barium *Group 3*—Bismuth, mercury, uranium, cobalt, zinc Observation of the increasing weight of a small sample is said to indicate the progress of the reaction

Powick (6), in his study of the rancidity of fats, has given detailed consideration to the substances found in rancid fats with the idea of determining the agent responsible for the odor as well as seeking the agent responsible for the reaction in the Kreis test Heptylic aldehyde is credited with the odor, and by spectroscopic methods the product of the reaction between acrolein and hydrogen peroxide has been found identical with that responsible for the color developed in the Kreis test, and identified as epihydrin aldehyde

The Kreis test has had more or less discussion as to its reliability, and it may be said in regard to the work done in connection with this paper that the Kreis test was not depended upon except in a rough way Powick found it unreliable in some cases and similar results have been obtained by many others The Kreis test is performed by taking 5 cc of the oil or fat to be examined, adding 5 cc of concentrated hydrochloric acid, shaking thoroughly and then adding 5 cc of 0 1% solution of phloroglucin in ether A red coloration in the acid layer indicates rancidity Holm and Greenbank (7) feel that the Kreis test is outranked by no other and are certain of its dependability They do, however, state that the test does not indicate the degree of rancidity Jones (8) regards the Kreis test as the best specific indicator of rancidity But it is generally agreed that the degree of color is not proportionate to the rancidity, and that is the difficulty that has been encountered in the following experiments The color developed is a very light pink in many cases and an indefinite pinkish brown in others, making it confusing in many instances

Richardson (9) reports that the test is not recommended for adoption by the American Oil Chemists Society The most satisfactory results have been obtained in these experiments with a type of mercury manometer and a test in which a potassium iodide solution was used Hyman and Wagner (10) used an alcoholic solution of potassium iodide and titrated the liberated iodine, after three minutes' standing in the dark, with 0 01 normal sodium thiosulphate, starch indicator These authors state that an attempted manometric method gave erratic results and for this reason they abandoned it in favor of the chemical test

Greenbank and Holm (11) concluded that methylene blue gave a good indication of the resistance offered by a fat to oxidation We have found in this laboratory that the reduction of methylene blue in fats is very unreliable as to the powers possessed by an added antioxidant and if reliance were placed on this method, monoethanolamine would be quickly eliminated as a desirable antioxidant, however we are using it with great satisfaction in an aqueous solution of an organic mercurial

In many instances refined oils and fats become rancid much more readily than the crude product and it has apparently been correctly assumed that refining removes some non-sterol portion which is a natural antioxidant

TESTS USED IN DETECTION AND DETERMINATION OF OXIDATION

The Methylene Blue Test —Twenty cc of fat are mixed with 1 or 2 cc of a 0 025% solution of methylene blue in absolute alcohol The use of alcohol other than absolute will introduce the factor of water in the experiment

The Guaiac Hemoglobin Test —To a 10 Gm sample add 4 or 5 drops of a one or two per cent solution of hemoglobin, 10 drops tincture guaiac and 10 cc of distilled water Allow to stand a few minutes when a blue color will be produced if oxygen has been absorbed

The Kreis Test —Has been given above

Alcoholic Potassium Iodide Test —To 5 Gm potassium iodide add 10 cc distilled water and ethyl alcohol 95% to make 100 cc To a 5-cc sample of the oil or melted fat add 5 cc of this alcoholic solution and shake thoroughly, allow to stand about fifteen minutes and the alcoholic layer will appear as the supernatant liquid It is essential that the samples for comparison be previously measured out and the addition of the potassium iodide solution be then made as near simultaneously as possible *Each sample is shaken the same length of time* The amount of color furnished by the liberated iodine will serve as an index to the amount of oxygen absorbed and the samples can be arranged accordingly

Work in this laboratory was begun on cod liver oil, this being a very good example of a medicinal oil upon which feeding tests can be readily made, and also representative of a drying oil which will show resinous deposits or films when oxidized From the latter standpoint work done upon linseed oil is applicable and considerable work has been done upon linseed oil and antioxidants Mattill (12) has reported results with numerous chemicals both on lard and cod liver oil

The first experiments undertaken were in connection with the antioxygenic activity of hydroxy-methyl-anethol, CH_3 OH CH_3CH CH C_6H_4O CH_3 Anethol is very rapidly oxidized even upon exposure to light, and since it is held more or less generally that the hydroxy compounds are a desirable class as antioxygens it appeared that this chemical might have satisfactory qualities

Three 25-Gm samples of cod liver oil were taken, plain oil, one containing 0 1% hydroxy-methyl-anethol (which for brevity will be designated as H M A) and oil containing 0 2% H M A Oxygen was slowly bubbled through the samples

and they were exposed to the light of a 100-watt lamp brought directly upon them These samples were in a cabinet and were kept at a temperature of 35° C The samples remained in this cabinet for a 24-hour period during which time 46-80 cc of oxygen passed through each sample Determinations were made for free fatty acids in an attempt to determine exactly the course of the reaction The results follow

Control	F F acids as % oleic	0 4022
Sample plain oil	F F acids as % oleic	0 4006
Oil with 0 1% H M A	F F acids as % oleic	0 4089
Oil with 0 2% H M A	F F acids as % oleic	0 4256

The results were too close together in the first three samples to make any conclusion whatever The sample containing 0 2% H M A did show that the induction of rancidity was definitely started

Taking a new sample of cod liver oil, four 150-Gm samples were taken, placed in a cabinet at 35° C and exposed to the light of a 100-watt lamp for 27 hours During this time oxygen was slowly bubbled through each sample until a total of 1600 cc had been brought into contact with each sample of oil Free fatty acid determinations were made (Col 1) and the samples were set aside at room temperature in the dark, at the end of six months the samples were checked for free fatty acids (Col 2)

The sample of plain oil was showing a film of oxidized oil on the surface, with a varnish-like deposit accumulating on the sides of the bottle at the surface The control sample was in the same condition with approximately thirty per cent less oxidized deposit The samples containing H M A were free from any film or resinous deposit The sample containing water was also free from any oxidized film Both the control and the plain oil sample had a decidedly rancid odor while the other samples were comparatively free from this odor, the H M A samples being best

All of the samples were then kept in the dark, at room temperature, and at the end of two years, acidity determinations were again made (Col 3)

Experiment ' A "		1	2	3
Control	F F acids as % oleic	0 379	0 6508	5 506
Sample plain oil	F F acids as % oleic	0 418	0 8606	6 809
Oil with 0 1% H M A	F F acids as % oleic	0 427	0 6313	1 083
Oil with 0 2% H M A	F F acids as % oleic	0 456	0 6603	2 085
Oil with 1 0% water	F F acids as % oleic	0 407	0 5751	1 040

The natural color was retained best by the sample to which water was added and was nearly as good in the sample containing 0 1% H M A The sample containing 0 2% H M A was slightly darkened, and the control and the plain oil sample were brown in color The rancid odor was much greater in the control and plain oil sample

Simultaneously with starting "A," 150-Gm samples of the same oil were exposed to heat only, the temperature being 50° to 52° C The control sample being the same as above

Experiment B '		End 1 Week	End 1 Month	End 6 Months
Sample plain oil	F F acids as % oleic	0 4234	0 5051	1 448
Oil with 0 1% H M A	F F acids as % oleic	0 4385	0 5320	1 131
Oil with 0 2% H M A	F F acids as % oleic	0 4365	0 5170	1 286
Oil with 1 0% water	F F acids as % oleic	0 4079	0 5603	1 486

It will be observed, in the determinations made at the end of twenty-seven hours and at the end of one week, that the induction of rancidity is more rapid with the addition of H M A and that the addition of water delayed this induction period The determinations at the end of one month, on the heated samples, show the effect of the added water and the lesser acidity of the sample containing 0 2% H M A The results are also shown for the end of a six months' period The sample of plain oil showed a thick resinous film on the surface and resinous deposits on the sides of the bottle The hydroxy-methyl-anethol samples were free from any film or deposit and the rancid odor was only about 25 per cent as great The sample containing water was somewhat cloudy and had a pronounced rancid odor, but had only a slight deposit or resinous film on the sides of the bottle

The apparent lengthening of the induction period, by the addition of water to cod liver oil, led to the washing of a sample of cod liver oil with three portions of distilled water The volume of water used for each washing was the same as the oil volume The oil was collected and filtered and samples were set aside for observation At the end of eight months the following samples were observed

Washed cod liver oil exposed to oxygen Retained natural color, showed very thin film, and the odor was only approximately 50 per cent as rancid as the control There was a slight deposit on the sides of the bottle

Washed oil + 5 per cent added water No film formed, a very slight deposit in bottle, 50 per cent, approximately, of rancid odor and a heavy white deposit in the bottom of the bottle

Control Dark yellow color, with a thin oxidized film, a strongly rancid odor and a small deposit on the sides of the bottle Duplicate samples were held at 50° C The control and washed oil samples showed heavy gummy deposits, resinous in appearance The washed oil + 5 per cent water showed no gummy deposit but did have a heavy film on the surface

There is apparently some substance present in cod liver oil which can be removed or inactivated with water, thereby prolonging the induction period of oxidation Perhaps in the sample washed with water, this substance reappears after oxidation begins and it may be that water present in the oil absorbs or hydrolizes this substance, thereby further preventing the oxidation

COMPOUNDS FAVORED AS ANTIOXIDANTS

The work done in all fields, for the prevention of oxidation has led to the establishment in general of favored types of compounds as antioxidants Following are several of these more favored types Phenolic compounds, hydroxy compounds, aldehydes, quinones, sterols, amines and alcohols

Ammonium compounds, sugars, and in many isolated instances some other compounds have unexpectedly shown inhibitor action Oxygen itself, acts as an inhibitor in the reaction between hydrogen and chlorine

COMPOUNDS USED IN THIS EXPERIMENT

A number of organic compounds were picked at random for determination of their antioxidant properties Principally these compounds come under the classes named as favorable antioxidants Flint-glass bottles of about one pint capacity were taken, in each bottle were placed 100 Gm cod liver oil containing 0 5 per cent of the chemical, the bottles were filled with oxygen and stoppered tightly and connected to a mercury gage to measure the amount of oxygen absorbed These bottles were set in a cabinet and a temperature of 58° to 60° C was maintained Two 100-watt lamps provided the heat, as well as light for whatever photochemical effect might be produced The experiment ran for a forty-hour period and the following results show the absorbed oxygen, no regard being given to color developed

Hydroxylamine Hydrochloride, NH OH HCl	0 00 cc O_2 absorbed in 40 hours
Alpha Naphthol $C_{10}H$ OH	0 50 cc O absorbed in 40 hours
p-Phenylenediamine, $NH_2C_6H_4NH_2$	3 90 cc O_2 absorbed in 40 hours
p-Dimethylaminobenzaldehyde, $(CH_3)_2NC_6H_4CHO$	4 55 cc O absorbed in 40 hours
Thymoquinone, C_6H_2O [1–4] CH_3 [2] C_3H_7 [5]	5 00 cc O absorbed in 40 hours
Blank Cod Liver Oil	5 05 cc O absorbed in 40 hours
Triphenylamine, $(C_6H_5)_3N$	5 15 cc O_2 absorbed in 40 hours
p Hydroxybenzaldehyde, C_6H_4OCHO	5 35 cc O absorbed in 40 hours

The *p*-Hydroxybenzaldehyde was in this case the least effective, oxidizing to such an extent in twenty-four hours that it was removed This rapid indication of oxidation cannot be definitely regarded as disqualifying a chemical, for there are two views to be taken of the induction period When an induction period is delayed or prolonged it may mean that the inhibitor used is one which will be protective by permanently preventing oxidation or it may be temporarily preventative and at the end of this temporary period oxidation may proceed with increased rapidity A second view to take of the induction period is that when it is extremely short, it may be an indication that the chemical has a great affinity for oxygen and is taking up the oxygen for the protective benefit of the substance to which it has been added From either viewpoint the possible value of the chemical cannot be definitely decided However, those chemicals which show a prolonged induction period are usually of value

A second experiment, made in the manner of the one just outlined, using a different sample of cod liver oil gave the following results

Alpha Naphthol, $C_{10}H_7$ OH	0 00 cc O_2 absorbed in 40 hours
Blank (plain cod liver oil)	3 95 cc O_2 absorbed in 40 hours
Benzophenone, $(C_6H_5)_2CO$	5 00 cc O_2 absorbed in 40 hours
8 Hydroxyquinoline (CH CH)C_6H_3 OH N CH	5 05 cc O_2 absorbed in 40 hours
Ergosterol, $C_{27}H_{42}O$ H_2O	5 10 cc O absorbed in 40 hours
Phenyl alpha naphthylamine, C_6H_5 $C_{10}H_6$ NH_2	5 10 cc O_2 absorbed in 40 hours

Duplicate cod liver oil samples of 100 Gm each, with 0 5 per cent of chemical added, were placed in an incubator at 50° C At the end of one month the samples appeared as follows No resinous film had formed in samples containing *p*-Phenylene diamine, *p*-Dimethylaminobenzaldehyde, Hydroxy-methyl-anethol, Alpha-naphthol, Thymoquinone, Phenyl-alpha-naphthylamine, Beta-naphthol, Thymol

A slight resinous deposit formed in samples containing 8-Hydroxy-quinoline, Triphenylamine, Benzophenone

A noticeable deposit of resinous character formed, on the sides of the bottles at the surface, in samples containing *p*-Hydroxy-benzaldehyde, Menthol, Ergosterol, Hydroxylamine hydrochloride, Plain cod liver oil

By the same method samples of olive oil were tested using

Menthol, $C_{10}H_{19}OH$	0 00 cc O_2 absorbed in 40 hours
Alpha-naphthol, $C_{10}H_7OH$	0 00 cc O_2 absorbed in 40 hours
Blank	3 80 cc O_2 absorbed in 40 hours

Further tests were made with olive oil, measuring the absorbed oxygen in the same manner and using 100-Gm samples of oil containing 0 5 per cent of chemical In this test the chemicals used were hydroxy compounds and organic acids

Tartaric acid, $C_2H(OH)_2COOH$	0 00 cc O_2 absorbed in 49 hours
Anisic acid, $C_6H_4OCH_3COOH$ [1 4]	1 70 cc O_2 absorbed in 40 hours
Hydroquinone, $C_6H_4(OH)$ [1 4]	3 30 cc O_2 absorbed in 49 hours
Pyrocatechin, $C_6H_4(OH)_2$ [1 2]	4 70 cc O_2 absorbed in 49 hours
Benzoic acid C_6H_5COOH	4 90 cc O_2 absorbed in 49 hours
Resorcin, $C_6H_4(OH)_2$ [1 3]	5 00 cc O_2 absorbed in 40 hours
Camphoric acid, $C_8H_{14}(COOH)_2$	5 10 cc O_2 absorbed in 49 hours
Salicylic acid, $C_6H_4(OH)COOH$ [1 2]	5 30 cc O_2 absorbed in 40 hours
Blank (plain olive oil)	5 30 cc O_2 absorbed in 49 hours

It will be noticed that three of these samples (salicylic acid, resorcin and anisic acid) ran only 40 hours, they were removed at that time because they were the only samples which were showing absorption of oxygen The induction period on all other samples occurred after the fortieth hour

As a check on the oxygen absorption, 5 cc of each sample were shaken with 5 cc of alcoholic potassium iodide solution As soon as the mixture separated into two layers the tubes were arranged in order according to liberated iodine shown The order was

1	Salicylic acid	7	Pyrocatechin
2	Resorcin	8	Hydroquinone
	Anisic acid	9	Tartaric acid
	Camphoric acid } 3–4–5–6	10	Unexposed olive oil
	Benzoic acid		
	Blank		

Numbers 3 to 6, inclusive, were so nearly equal in color that it was not possible to determine the order of arrangement It should be noted that this test gave very consistent results with the measured oxygen absorption, the greatest difference by measurement being 0 4 cc between the benzoic acid sample and the blank Anisic acid would without dispute hold position No 3 when its induction period of forty hours is considered Blank tests run by adding these chemicals to the alcoholic potassium iodide did not change the positions It is also seen that while three dihydroxy benzenes were used, no consistent results were obtained in regard to the positions of the hydroxyl groups Hydroquinone, with the OH groups in the 1 4 positions, is the best antioxidant and if wide separation of the OH groups is an advantage, resorcin should be better than pyrocatechin, such, however, is not the case Blank tests should always be made with the alcoholic potassium iodide to determine whether or not the chemical under examination liberates iodine In a

further experiment phloroglucin, $C_6H_3(OH)_3 + 2H_2O$, pyrogallol $C_6H_3(OH)_3$ [1 2 3] and tartaric acid were found very effective in the order named

Some of these chemicals used in these experiments were not soluble in a proportion of 0 5 per cent, but the results are given regardless, for the insolubility in this proportion would merely indicate that a smaller amount would be necessary

Rogers and Voorhees (14) in their work on gasoline have used a few of these chemicals, in addition to many others, and with favorable results

Three compounds typical of as many chemical groups were taken for feeding tests upon white rats, and Vitamin A assays These three compounds beta-naphthol, thymoquinone and hydroxy-methyl-anethol preserved the appearance of the cod liver oil as it was naturally, and prevented the formation of any resinous film There was no apparent difference in the Vitamin A activity as compared with a control sample, indicating that there was no deleterious effect of the compounds on the vitamin activity The compounds did not, however, aid in retaining the vitamin activity of the oil to give it any advantages over the control sample of the same age Feeding tests upon a more extensive scale and with several of the other compounds used as antioxidants might show some that preserved the vitamin activity in addition to the physical characteristics of the oil

CONCLUSIONS

It can be stated definitely, that there is no absolute means of pre-determining the value of an antioxidant in oils and fats merely from the chemical structure of the compound

Apparently the naphthols, quinones and hydroxy compounds are three of the most dependable types

The "trial and error" method must be used to determine two things—*first*, the possible value of the antioxidant and *second*, the amount necessary to give the maximum activity

While this paper involves only the use of antioxidants in oils, work done of a similar nature in aqueous solutions bring conclusions that parallel those just given

Thanks are due to Charles R Eckler for his work on the vitamin activity of the cod liver oil, and to W J Rice for criticisms

REFERENCES

(1) Moureu and Dufraisse *Chem Reviews* 3 (1926–1927), 113–162
(2) Keegan, *Chem News*, 108 (1913), 61–62 (*Chem Abstracts* 7, 3515)
(3) Overholser and Cruess, *Calif Agr Expt Sta Tech Paper* No 7 (*Chem Abstracts*, 18 (1923), 3629)
(4) Lubimenko, *Compt rend*, 160 (1915) 479–481 (*Chem Abstracts*, 9, 2101)
(5) Phokin, *J Russ Phys Chem Soc*, 39 (1907), 3078 (*Chem Abstracts*, 1, 1774)
(6) Powick, *J Agr Research*, 26 (1923), 323–362
(7) Holm and Greenbank *Ind Eng Chem*, 15, (1923), 1051, *Ibid* 16 (1924) 518
(8) Jones, *J Soc Chem Indus*, 43 (1924), 1258
(9) Richardson, *Oil and Fat Industries*, 7 (1931), 269
(10) Hyman and Wagner *J A C S*, 52 (1930), 4345
(11) Greenbank and Holm *Ind Eng Chem*, *Analyt Edit*, 2 (1930), 9
(12) Mattill, *J Biol Chem*, 90 (1931) 141
(13) Mattill and Crawford, *Ind Eng Chem*, 22 (1930) 341
(14) Rogers and Voorhees, *Ibid* 25 (1933) 520

PHARMACEUTICAL LABORATORY ELI LILLY AND COMPANY, INDIANAPOLIS, INDIANA

ELECTROLYSIS OF SODIUM IODOBISMUTHITE SOLUTIONS *

BY A E JURIST AND W G CHRISTIANSEN

Iodobismitol, a solution of sodium iodobismuthite and sodium iodide in ethylene glycol, has been shown by Hanzlik, Mehrtens, Gurchot and Johnson (1) to be of value in the treatment of syphilis Sodium iodobismuthite has the empirical formula—Na_2BiI_5—and has been described by Nickles (2), Astre (3) and Draggendorf (4) Hanzlik has stated that the bismuth in this compound, more especially in Iodobismitol, is anionic, whereas most bismuth solutions contain cationic bismuth, the anionic character of the bismuth is reported as being related to the therapeutic efficacy of Iodobismitol The present paper describes in detail a simple and rapid method by which the migration of the bismuth in Iodobismitol may be demonstrated, this method was suggested to us by Hanzlik

APPARATUS

The cell is a U ' tube having legs 20 cm long and 7 mm internal diameter A stop-cock is sealed into each leg 15 cm from the top, this cock makes it possible to fill the bottom of the ' U" and the cocks with the solution to be tested, close the cocks, clean the upper part of each leg completely (this is essential) and fill the tubes above the cocks with any desired liquid so that there will be no traces of the test solution in the upper parts of the legs, *i e*, the electrode chambers and so that the division between the test solution and the overlayering liquid will be sharp When the cell has been filled platinum screen electrodes which are connected to a 110 volt direct current are inserted into the liquids in the electrode chambers so that the bottom of each electrode is 7 5 cm above the stop-cocks

PROCEDURE

Iodobismitol is placed in that portion of the cell between the stop-cocks, filling the cocks The electrode chambers (the legs above the stop-cocks), after completely removing any traces of the Iodobismitol solution, are filled with 75% aqueous acetic acid The electrodes are inserted, the current is turned on and the stop-cocks are carefully opened

OBSERVATIONS

1 Current—At the outset the current flow is 0 21 m a but it gradually rises to 0 62 m a at the end of three hours

2 Migration—(*a*) Shortly after the current has been turned on the red Iodobismitol solution moves toward the anode and can be seen above the top of the stop cock, whereas the level of the red Iodobismitol does not change on the cathode side

(*b*) After two hours the red color has risen 2 7 cm above the stop cock on the anode side and a noticeable amount of iodine is liberated at the anode No change is detectable in the liquids on the cathode side with the exception of a dark stain (bismuth) on the cathode

(*c*) After three hours the amount of iodine liberated at the anode has become so great that the migration of the red Iodobismitol solution toward the anode is obscured

3 Chemical Tests Demonstrating Migration—The stop-cocks are closed and the current is shut off The liquid surrounding the anode gives a positive test for bismuth and for free iodine The black stain on the cathode is removable with aqua regia and the residue obtained by evaporating the aqua regia gives a positive test for bismuth

The foregoing is the simplest and most rapid method for demonstrating the migration of bismuth during the electrolysis of Iodobismitol The chief difficulty

* Scientific Section, A PH A , Toronto meeting 1932

with the method is the tendency of the liberated iodine to obscure the extent of migration of the colored solution toward the anode This has been successfully avoided by using a different type of cell and different conditions as described below

APPARATUS

This cell (diagram 2) is specially designed to permit removal separately of the overlayering liquids in the electrode chambers, withdrawal of the iodobismuthite solution or addition of material (acid or sodium iodide) to the overlayering liquids or the iodobismuthite solution without disturbing the rest of the experiment Also, the electrodes are so placed in special side arms as to prevent any material, such as iodine liberated at the anode, from diffusing back and obscuring the phenomena to be observed during the electrolysis

PROCEDURE

A 1% solution of sodium iodobismuthite in ethylene glycol is placed in the "U" shaped portion of the tube between the stop-cocks It is overlayered with a 0 2% sodium iodide solution in ethylene glycol 3 parts—water 1 part, the space

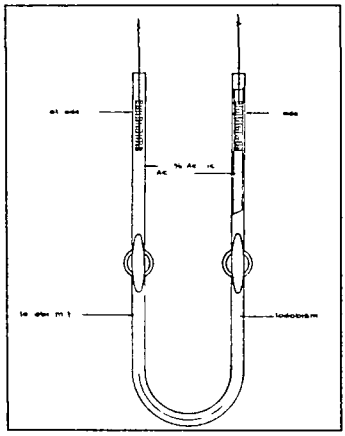


Fig 1

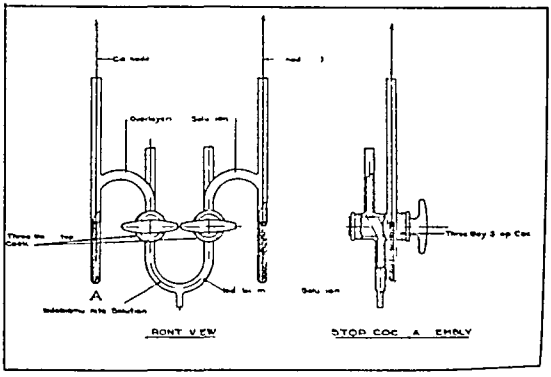


Fig 2

(A) surrounding the cathode is filled with $N/5$ hydriodic acid in ethylene glycol After twenty-four hours' electrolysis the current has risen to a maximum of 0 12 m a and remains at this level The cathode has a black stain on it as usual and the interface between the iodobismuthite solution and the liquid surrounding the cathode has dropped 2 5 cm while the colored solution has migrated 3 cm toward the anode which is surrounded by a brown color of free iodine At this point the stop-cocks are closed and the solutions surrounding the anode and cathode are withdrawn Fresh solutions are then substituted for them and the iodobismuthite solution remaining between the cocks is treated with sodium iodide equal to three-quarters of the amount originally present and thoroughly mixed The current is again turned on During the second twenty-four hours the current reaches a maximum of 0 4 m a and at the end of this period there is a depression of the interface between the iodobismuthite solution and the solution surrounding the cathode of 3 75 cm Again there is migration of color toward the anode with much liberation of iodine at the anode The solutions surrounding the electrodes are again

removed and replaced with fresh solutions and again the sodium iodide, 30 mg, is put into the iodobismuthite solution The current is again turned on and the maximum during the third twenty-four hours is 0 4 m a At the end of the third twenty-four-hour period the appearance of the experiment is much the same as at the end of the second twenty-four hours The electrolysis is allowed to proceed undisturbed for four more days, making a total of seven days At the end of this period the current has fallen to zero, the interface between the iodobismuthite solution and the liquid surrounding the cathode is 2 5 cm below the stop-cock and there is a noticeable black stain on the cathode The anode is surrounded by a brown iodine solution and the colored iodobismuthite solution has migrated toward the anode to a large extent The iodobismuthite solution remaining between the stop-cocks is extremely pale showing that most of the bismuth has been removed by electrolysis

ASSAYS

Bismuth in original iodobismuthite solution		5 9 mg
Bismuth in anode liquid		
(*a*) 1st stage	2 1 mg	
(*b*) 2nd stage	1 6 mg	
(*c*) 3rd stage	0 8 mg	
Total	4 5 mg	
Bismuth on cathode	0 4 mg	
Unmigrated bismuth	1 5 mg	
Total recovered		6 4 mg [1]

[1] This figure, the sum of 5 separate assays, is 0 5 mg above what it should be, due no doubt to limits of accuracy in the separate assays

This procedure shows that most of the bismuth in the solution will migrate toward the anode if fresh electrolyte, sodium iodide, is periodically added In this procedure anodic migration is not obscured by the presence of free iodine diffusing back into the iodobismuthite solution

REFERENCES

(1) Hanzlik, Mehrtens Gurchot and Johnson *J Am Med Assoc*, 98 (1932), 537
(2) Nickles, *J pharm chim* (3), 40 (1861) 324, (3), 41 (1862), 148, *Compt rend*, 50 (1860), 872
(3) Astre, *Compt rend*, 110 (1890), 525 1137
(4) Draggendorf, *Pharm Ztg* Russia, 5 (1866), 82

RESEARCH DEPT OF THE CHEMICAL & PHARMACEUTICAL LABORATORIES,
E R SQUIBB & SONS,
BROOKLYN N Y

A Ph A Resolution No 3 Dispensing of Liquor for Medicinal Purposes

Resolved, that the Officers and Council of the AMERICAN PHARMACEUTICAL ASSOCIATION be instructed to take such steps as they may deem necessary in the event of repeal of the 18th amendment, to prevent the sale of beverage liquor in pharmacies or drug stores, and be it further

Resolved, that it shall be the declared policy of the AMERICAN PHARMACEUTICAL ASSOCIATION to favor the dispensing of liquor for medicinal purposes only on physicians' prescriptions

A REACTION FOR PHENOBARBITAL *[1]

BY GEORGE D BEAL[2] AND CHESTER R SZALKOWSKI[3]

The tests described in the pharmacopœias of the United States, Great Britain and Germany direct the use of mercuric nitrate or mercuric chloride for the identification of barbital and phenobarbital Since barbital, phenobarbital, dial (diallylbarbituric acid) and other barbiturates produce a white precipitate with both of these reagents it is the opinion of the authors that a more specific test is desirable in order to differentiate between the official compounds

Barbituric acid derivatives are usually identified by recrystallization (1) and few chemical tests for their identity are described in the literature Most of the tests are not specific and the presence of phenobarbital cannot be established with Millon's reagent, Denigès' reagent, phenylhydrazine and sodium nitroprusside, or sulphuric acid and naphthol

Paget and Desogt (2) used Millon's reagent to differentiate allylbarbituric acids from other barbituric acid derivatives Cobalt salts were used for the detection of barbiturates by Parri (3), Zwikker (4), Bodendorf (5), and Koppanyi *et al* (6), but they did not prove them to be entirely specific The murexide test, described by Handorf (7), is not sufficiently specific

Ekkert (8) used formaldehyde and sulphuric acid to differentiate phenobarbital from barbital and proponal He also (9) used selenious acid to distinguish phenobarbital from barbital Cinchophen and neocinchophen show a similar reaction with selenious acid

Lyons and Dox (10) employed *p*-nitro benzoyl chloride in the identification of alkylbarbituric acids van Itallie and Steenhauser (11) reported the behavior of barbituric acid derivatives toward solutions of ammonium phosphate, bromine water, Schweitzer's reagent, silver nitrate and barium hydroxide

Denigès (12) recrystallized the barbiturate and identified it by means of its crystal formation under a microscope Zamporo (13) showed that phenobarbital produces a color with sodium nitrite in presence of sulphuric acid while barbital does not Ramwez (14) nitrated the phenyl group and in this way was able to differentiate between barbital and phenobarbital

David (15) was able to differentiate between barbital and phenobarbital in admixture by dissolving the sample in ammonium hydroxide and treating with hydrogen peroxide He was able to show the presence of phenobarbital by the formation of a wine color He has also described a reaction for barbital with alcohol, nitrous acid and sulphuric acid, afterward neutralizing with sodium hydroxide Under his conditions barbital produces an orange-yellow color and phenobarbital a lemon-yellow Lagrace (16) used vanillin in sulphuric acid to identify dial This reaction is also obtained with allyl alcohol, terpenes, menthol, camphor and other similar compounds

Mohler's (17) test for benzoic acid seemed to the authors to offer the possibility of differentiating between phenylated and non-phenylated barbiturates by

* Scientific Section, A PH A , Madison meeting, 1933

[1] Published by permission of the chairman of the Committee of Revision, U S P XI

[2] Assistant Director, Mellon Institute of Industrial Research, Pittsburgh, Pa

[3] Assistant in Research in Pure Chemistry, Mellon Institute

nitration of the phenyl group Benzoic acid is converted to *m*-dinitrobenzoic acid by heating with sulphuric acid and potassium nitrate, made alkaline with ammonia, and reduced with colorless ammonium sulphide to the *m*-diamino compound, producing a red-brown color which changes to greenish yellow

We have found that the following procedure will yield a definite reaction with phenobarbital that is not duplicated by any of the non-phenylated derivatives of barbituric acid

In a large, hard glass test-tube mix 0 2 Gm of the sample with 0 5 Gm of potassium nitrate, and add 2 cc of sulphuric acid Heat the entire mixture in boiling water for twenty minutes, cool, and carefully add 3 cc of distilled water Make the solution strongly ammoniacal and boil gently to destroy any ammonium nitrite formed To the cooled mixture, add without mixing 2 or 3 drops of colorless ammonium sulphide U S P T S

Phenobarbital will show the formation of a reddish brown ring which diffuses and forms an orange color throughout the mixture On heating, the color becomes a little more intense and finally becomes greenish yellow Barbital does not give this reaction Benzoic acid produces a reddish brown ring on the addition of the ammonium sulphide, but on heating becomes yellow-green

SUMMARY

Mohler's reaction may be used to distinguish phenobarbital from barbital The progress of the reaction differs slightly from that with benzoic acid In the latter case the reddish brown ring diffuses to form a solution of the same color, and on heating changes to a yellowish green solution With phenobarbital, on the other hand, the reddish-brown ring diffuses to form an orange-colored mixture which is turbid Upon heating the color becomes more intense, shading into orange-red, and eventually becomes greenish yellow, the precipitate persisting

BIBLIOGRAPHY

(1) Bachem, *Arch exptl Path Pharm*, 63 (1910), 228
(2) Paget and Desogt *Bull sci pharmacol*, 39 (1932), 532
(3) Parri, *Boll chim -farm*, 63 (1924), 401
(4) Zwikker, *Pharm Weekblad*, 68 (1931), 975
(5) Bodendorf *Arch Pharm*, 270 (1932), 291
(6) Koppanyi, Murphy and Krop, *Proc Exp Soc Biol and Med*, 30 (1933), 542
(7) Handorf, *Z ges exptl Med*, 28 (1922), 56
(8) Ekkert, *Pharm Ztg*, 67 (1926), 481
(9) Ekkert, *Ibid*, 73 (1932), 487
(10) Lyons and Dox, *J A C S*, 51 (1929) 288
(11) van Itallie and Steenhauser, *Pharm Weekblad* 67 (1930), 797
(12) Denigès, *Bull soc pharm Bordeaux*, 67 (1929) 165
(13) Zamporo, *Boll chim -farm*, 64 (1925), 257
(14) Ramwez, *J pharm Belg*, 6 (1924), 410, 501
(15) David, *Pharm Ztg*, 77 (1932) 1165
(16) Lagrace, *J pharm chim*, 12 (1930), 364
(17) Sherman, "Organic Analysis," 2nd Edition The Macmillan Co (1912), 387

PITTSBURGH, PA
September 23 1933

THE CHEMISTRY OF HEPTANE AND ITS SOLUTION *[1]

NO 7 THE SOLUBILITY OF METHYLAMINE IN HEPTANE

BY G O DOAK

While studying the action of methylamine on arsenic trichloride in heptane solution, it seemed desirable to learn something about the solubility of the base in the hydrocarbon For this purpose a commercial 33 per cent alcoholic solution of methylamine (Eastman Kodak Co) was transferred to an Erlenmeyer flask connected with a reflux condenser, which, in turn, was connected with a calcium chloride tower and this with four flasks containing heptane surrounded by a freezing mixture

In order to liberate the methylamine in the Erlenmeyer, it was not necessary to heat the alcoholic solution A current of nitrogen, the rate of which was regulated by bubbling it through glycerin, released the base Any alcohol carried over with it was held back in the $CaCl_2$ tower The first receiving flask was regarded as saturated when methylamine escaped from the fourth

The methylamine content of the heptane solution, after it had stood at room temperature (22°), was determined in 5-cc portions as the platinum double salt and by titration The amount of platinum obtained after ignition of the double salt revealed the amount of methylamine when computed after the formula B_2H_2-$PtCl_6$ in which B, the base, stands for methylamine In the titration, 5-cc portions were shaken with 25 cc of $N/100$ HCl (1) and the excess of acid titrated back with $N/100$ NaOH (2) using phenolphthalein as indicator Duplicates by both methods gave the following results recorded as grams per cc of heptane

	Platinum Double Salt	Titration
1	0 00109 Gm	0 000595 Gm
2	0 00113 Gm	0 000595 Gm
Average	0 00111 Gm	0 000595 Gm

Hence the titration method yielded results 45 9 per cent lower than the platinum double salt method Both methods were repeated, but in the titration method the methylamine was shaken out four successive times with four separate portions of $N/100$ HCl, namely, 25 cc , 15 cc , 5 cc and 5 cc , respectively This time the following results were obtained

1	0 00115 Gm	0 00127 Gm
2	0 00112 Gm	0 00125 Gm
Average	0 00114 Gm	0 00126 Gm

Whereas the results obtained by the platinum chloride double salt method were essentially the same as those obtained before, the modified titration method gave much higher results than those obtained in the first series, indeed 9 6 per cent higher than the precipitation method

* Scientific Section, A PH A , Madison meeting, 1933

[1] From the laboratory of Edward Kremers

In order to determine the solubility of methylamine in heptane at different temperatures, 5-cc quantities were saturated with the base Before shaking out the base with acid, nitrogen was passed over the heptane solution for 10 minutes to remove gaseous methylamine from the flask The results of a duplicate series of determinations are herewith tabulated as grams per 1 cc of solvent

t	I	II
40°	0 00024 Gm	0 00024 Gm
20°	0 00031 Gm	0 00028 Gm
10°	0 00048 Gm	
3°	0 00072 Gm	0 00081 Gm
0°	0 00120 Gm	0 00123 Gm
−5°	0 00137 Gm	0 00168 Gm
−10°	0 00128 Gm	0 00127 Gm
−13°	0 00075 Gm	0 00081 Gm

Methylamine is reported to liquefy at −7° at which temperature it shows its maximum solubility in heptane, the solubility diminishing not only above this point, but below as well

In order to check the solubility at the higher temperatures used, heptane was saturated at 0° and the temperature raised to 20° and kept there for 15 min before 5-cc portions were withdrawn for titration The same performance was repeated at 40° Again the results are tabulated

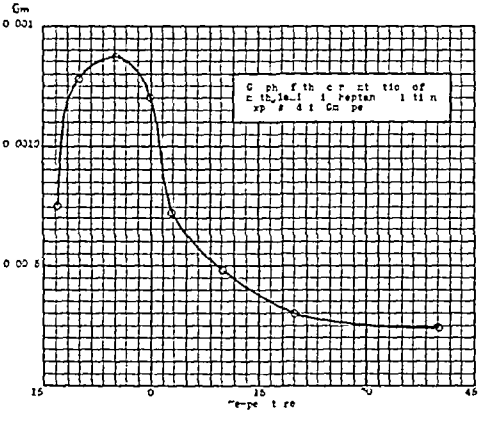


Fig 1

40°	0 000139 Gm	0 000149 Gm
20°	0 00027 Gm	0 00028 Gm

The accompanying curve reveals graphically the solubilities at different temperatures as already stated

REFERENCES

(1) The standard HCl was prepared by the method of a constant boiling mixture as described by C W Foulk and M Hollingsworth, *J A C S*, 45 (1923), 1220

(2) The standard NaOH was prepared by precipitating the carbonates from a concentrated solution of NaOH with barium chloride and diluting with carbon dioxide-free water in an atmosphere of nitrogen

---

A Ph A Resolution No 11 Historical Material for Museum and Library of Headquarters Building

Resolved that the Local Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION, State Pharmaceutical Associations, Boards and Colleges of Pharmacy as well as other organizations and individuals interested in the progress and development of pharmacy be urged to supply documents of historical interest, relics and museum material to the museum and library of the Headquarters Building of the AMERICAN PHARMACEUTICAL ASSOCIATION at Washington

DETECTION OF GELATIN IN AGAR [1] [2]

BY GEORGE D BEAL[3] AND CHESTER R SZALKOWSKI [4]

The U S P X test for the detection of gelatin in agar reads as follows

'A solution made by boiling 0 1 Gm of Agar in 100 cc of water and cooling yields no precipitate with tannic acid T S "

This test has been reported to us as yielding a positive reaction with agar known to contain no gelatin Agar belongs to the galactan group of carbohydrates and should not react with the protein reagents In this investigation the effects of the common protein reagents on agar and agar adulterated with gelatin were studied

EXPERIMENTAL

Reagents —The behavior of the following reagents upon solutions of agar and agar containing gelatin was determined Copper sulphate T S , mercuric nitrate T S , tannic acid T S , and also a saturated aqueous solution, picric acid T S , a saturated aqueous solution and a saturated alcoholic solution, bromine T S , mercuric potassium iodide T S , phosphotungstic acid (1 10) and trichloracetic acid (1 4) The following special reagents were also used

Millon s Reagent —Dissolve 1 part, by weight, of mercury in 2 parts, by weight, of nitric acid and dilute with 2 volumes of distilled water

Robert's Reagent —Add 1 volume of nitric acid to 5 volumes of a saturated aqueous solution of magnesium sulphate

Tanret's Reagent —Dissolve 1 35 Gm mercuric chloride in 25 cc of water, add 3 32 Gm potassium iodide dissolved in 25 cc of water, dilute to 60 cc with water and add 20 cc of glacial acetic acid

Samples —Three samples of agar were available, all of which were asserted to be free from gelatin The nitrogen content of the samples, determined by the Kjeldahl method, were

Sample	% *N*	% Protein (*N* × 6 38)
A	0 20	1 276
B	0 13	0 829
C	0 0355	0 226

These were used in the proportion of 1 Gm dissolved in 100 cc of boiling distilled water, and are designated as Solutions A, B and C

Solution D —1 Gm of gelatin dissolved in 100 cc of boiling water

Solution E —1 Gm of Sample A containing 10% of gelatin dissolved in 100 cc of boiling water

Solution F —1 Gm of A containing 5% of gelatin dissolved in 100 cc of boiling water

Solution G —1 Gm of A containing 1% of gelatin dissolved in 100 cc of boiling water

Solution H —1 Gm of A containing 0 1% of gelatin dissolved in 100 cc of boiling water

Solution I —1 Gm of A containing 0 01% of gelatin dissolved in 100 cc of boiling water

Solution J —1 Gm of B containing 1% of gelatin dissolved in 100 cc of boiling water

Solution K —1 Gm of B containing 0 1% of gelatin dissolved in 100 cc of boiling water

---

[1] Published by permission of the chairman of the Committee of Revision U S P XI

[2] Scientific Section A PH A , Madison meeting, 1933

[3] Assistant Director, Mellon Institute of Industrial Research, Pittsburgh, Pa

[4] Assistant in Research in Pure Chemistry, Mellon Institute

All of the tests were performed at a temperature of 40–50° C unless otherwise specified

The tests and results may be described as follows

Tannic Acid T S added drop by drop produced a pronounced turbidity in Solutions A, B and C, and a precipitate in the remaining solutions The sensitivity was not especially changed by the use of a saturated solution of tannic acid

Millon's Reagent added drop by drop produced a turbidity in Solutions A, B and C, and a precipitate in the remaining solutions, which became slightly pink on heating

Mercuric Potassium Iodide T S and *Bromine T S* added drop by drop produced neither precipitate nor turbidity

Phosphotungstic Acid added drop by drop produced a slight turbidity in Solutions A, B and C, and a white precipitate in the remaining solutions

Trichloroacetic Acid produced no precipitate with the pure agars, nor when the gelatin concentration was 0 1% or less In the presence of larger amounts of gelatin a white precipitate was produced

Tanret's Reagent yielded no precipitate with the pure agars A faint turbidity was produced by 0 01% of gelatin, while the higher concentrations formed a precipitate

Robert's Reagent produced a precipitate only when the concentration of gelatin was 1% or greater

Biuret Reagent —To 5 cc of the agar solution was added an equal volume of potassium hydroxide (1 4) and, after mixing, 3 drops of copper sulphate T S The solutions of pure agar showed only the color of the reagent When 1% or more of gelatin was present the characteristic purple color of copper biuret was produced With the lower concentrations of gelatin the blue color of the copper reagent was modified by a slightly purple tint

Picric Acid T S was added dropwise to the agar solution and the mixture allowed to stand Saturated aqueous and alcoholic solutions of picric acid were also added dropwise to separate portions of solution A distinct yellow precipitate was formed in every instance when gelatin was present, while Solutions A B and C remained clear

CONCLUSION

Tannic acid produced a precipitate with pure agar and as a result it cannot be used as a test for gelatin Picric acid will precipitate gelatin but will not precipitate agar and is a very good reagent for the detection of gelatin An alcoholic solution of picric acid is more sensitive toward the gelatin than an aqueous solution

Tanret's reagent is not as sensitive toward gelatin as picric acid It will precipitate gelatin but not agar The biuret test is obtained with gelatin and samples of agar containing over one per cent of gelatin

Millon's reagent is a common protein reagent, but all proteins do not react with the reagent It will form a white precipitate with agar containing gelatin

No precipitates could be obtained with the metallic salts The best results were obtained with picric acid solutions and Tanret's reagent

In the authors' opinion, the U S P should prescribe the following test for gelatin in agar

Dissolve 1 Gm of Agar in 100 cc of boiling distilled water and allow to cool to about 50° C To 5 cc of the solution add 5 cc of picric acid T S , no turbidity appears within ten minutes (*gelatin*)

PITTSBURGH, PA
November 9, 1933

ORGANOLEPTIC BIOASSAYS * [1]

BY JAMES C MUNCH, GEORGE E BYERS AND HARRY J PRATT

"The tongue is more sensitive than the most delicate chemical reaction" (1) The literature on taste tests has been assembled (6)

The bioassay of capsicum has been proposed, studied in detail and adopted in U S P X (2, 3, 4, 5, 7, 9, 10) As a result of investigations undertaken by one of us, a proposed modification of the U S P X method has been published for consideration in the forthcoming XIth revision, (4, 5) This method is as follows

'Shake 1 Gm of coarsely powdered capsicum with 50 cc of alcohol in a stoppered flask for 3 hours Dilute 0 1 cc of the clear supernatant liquid with 100 cc of 10% sucrose solution Five cc of this dilution swallowed during 5 seconds will produce the same degree of pungency in the throat as 5 cc of 10% sucrose solution containing 16 mg of piperine per L In case 16 mg of piperine per L does not produce satisfactory pungency, the threshold concentration should be determined and corresponding alterations made in the standard for capsicum (0 1 cc per 100 cc or 20 mg per L)

Further studies on this method have been made in a class of twenty-six students during the last year It was found that very good agreements were obtained when proper recognition was given to the threshold of each investigator The usual piperine threshold was 16 mg per L Two students showed consistently values of 15 mg per L Several others occasionally required concentrations of 17 or 18 mg per L However, by proper correction to a standard of 16 mg consistent results were obtained in all cases The suggested value of 20 mg of capsicum per L as a standard of pungency was met by five commercial samples tested at this time

Four samples of commercial oleoresin were tested under the same conditions A weighed amount of oleoresin was dissolved in 95 per cent alcohol to represent a dilution of 1 Gm in 5 cc and used for tasting, according to the method reported The threshold of 3 5 mg per L previously recorded was met by all samples Several of the samples previously reported (4), were re-tasted three years after the original assays, and no change in minimum effective concentration was observed No change in the previous recommendation of 3 5 mg of oleoresin of capsicum per L appears necessary

A few studies have been previously reported on the pungency of ginger and its oleoresin (2, 6, 8) The limit of pungency of Philippine Ginger ranged between 200 and 400 mg per L in ten persons who were not otherwise standardized (8) For the oleoresin, perceptible pungency was reported at a concentration of 3 3 to 5 mg per L (2)

In this investigation a series of commercial samples of crude ginger were obtained and made into fluidextracts These were tested by dilution with 10 per cent sucrose solution, etc , following the method proposed for capsicum The pungency was detectable on the tongue and cheeks as well as in the throat These samples showed threshold values of 350 to 400 mg of ginger per L [2]

---

* Scientific Section, A PH A , Madison meeting, 1933

[1] Joint communication from the Department of Research School of Pharmacy, Temple University and Department of Pharmacology, Sharp and Dohme, Philadelphia, Penna

[2] We wish to acknowledge our appreciation of the courtesy shown by Sharp and Dohme, Inc , of Philadelphia, in furnishing the material used in these investigations

A few tests were made on the commercial oleoresins of ginger Four samples were tested and found to produce a threshold pungency in concentrations of 5 mg per L

CONCLUSIONS

1 A modified method for the bioassay of capsicum has been developed and proved successful in a series of assays by our students

2 As standards of pungency it is recommended that 20 mg of capsicum per L, and 3 5 mg of oleoresin of capsicum per L should produce the same degree of pungency as 16 mg of piperine per L (Threshold concentrations)

3 This method is suitable for the bioassay of ginger and its oleoresin

4 As standards of pungency threshold concentrations of 400 mg of ginger and 5 mg of oleoresin of ginger per L are suggested

BIBLIOGRAPHY

(1) G Cohn, 'Die organischen geschmacksstoffe,' 1914

(2) A G DuMez, A century of the United States Pharmacopœia, 1820–1920, I The Galenical Oleoresins," *Inaug Dis* Wisc, 1917

(3) E N Gathercoal and R E Terry The capsicum monograph in U S P X" Jour A Ph A, 10 (1921), 423–428

(4) James C Munch, Bioassays of Capsicum and Chillies I," *Ibid*, 18 (1929) 1236–1246

(5) James C Munch, 'The Bioassay of Capsicum U S P X," *J A O A C*, 13 (1930), 383–385

(6) James C Munch, Bioassays A Handbook of Quantitative Pharmacology," 1931

(7) W L Scoville, 'Note on Capsicums," Jour A Ph A 1 (1912), 453–454

(8) P Valenzuela, "Philippine Ginger" *Ibid*, 15 (1926), 652–661, 734–744

(9) R Wasicky and F Klein Uber die wertbestimmung von capsicum" *Festschrift fur A Tschirch* (1926), 357–361

(10) E H Wirth and E N Gathercoal, Report of the Scoville Organoleptic Method for the Valuation of Capsicum," Jour A Ph A 13 (1924), 217–219

NOTES ON THE B P COLORIMETER TEST FOR ERGOT *

BY F A UPSHER SMITH

The color test for ergot devised by Maurice I Smith (1) in 1930 soon found favor in Great Britain, so that it was adopted in the 1932 edition of the British Pharmacopœia

Wokes (2) found that the test fails to distinguish between the inactive and active constituents of ergot The four alkaloids, ergotoxine, ergotamine, ergotinine and ergotaminine, all gave the identical blue color with the Maurice Smith reagent when examined spectroscopically In spite of the fact that this test does not measure solely the physiologically active substances in ergot, it was adopted for the following reason The colorimeter test measures the total alkaloid with greater accuracy than the biological method measures the physiologically active alkaloid

In the Report of the Sub-Committee on Ergot of the British Pharmacopœia Revision Committee (3), the conclusion was reached that the results by the bio-

* Scientific Section, A Ph A, Madison meeting 1933

logical test are lower than those given by the chemical methods, the ratio of the average results is 2 1 In setting the potency of ergot at "0 05% of the total alkaloids of Ergot, calculated as ergotoxine," the committee took into consideration the evidence which suggests that 60 to 70% of the total alkaloid consists of ergotoxine Consequently, a total alkaloidal percentage of 0 05 is equivalent to an ergotoxine percentage of 0 03

Up to the present time the majority of authorities have regarded either ergotoxine or ergotamine as the physiologically active constituent of ergot The U S P Cock's Comb method, the Broom-Clark epinephrin-reversal method, and the Maurice Smith colorimeter test all agree in valuing the ergot or its preparations according to the amount of alkaloid present With this idea in mind, the fluidextracts of the U S P and of the B P have been made with acidified diluted alcohol, in order to ensure as high an alkaloidal content as possible The aqueous preparations of ergot, known to be deficient in alkaloid, have accordingly fallen into disrepute, in spite of the fact that the introduction of ergot into medicine was in the form of an infusion or decoction of the drug

The consensus of opinion on ergot might, therefore, be held to favor the use of preparations containing the correct proportion of alkaloids, such as the fluidextracts of the U S P and of the B P , and to warrant the discarding of aqueous preparations of ergot, deficient in alkaloids Strange to say, the situation has been complicated by the publication in June of last year of a paper by Dr Chassar Moir (4), Obstetric Unit, University College Hospital, London, which has once more reopened the whole question as to what is the active principle of ergot Working on human patients, Dr Moir found that the effect of ergot when taken by mouth was to induce with remarkable rapidity strong uterine contractions, which lasted only for a limited time This was in contrast with the known effect of ergotoxine, which is slower to start and more persistent in duration Moir concluded that there must be in ergot some principle not previously isolated and identified Dr Moir found that the aqueous extracts and fluid preparations of ergot, even when old and containing at best but a trace of alkaloid, possessed the activity ascribed to this unknown substance He found, however, that the B P liquid extract of ergot, which agrees closely in formula and composition with the U S P fluidextract of ergot, also possessed this effect in about the same degree It follows, therefore, that ergot contains an unknown active principle with a rapid but fleeting action, and alkaloids, such as ergotoxine, which are slower in action but more persistent It is possible that the unknown principle initiates the contraction of the uterus, and that in turn the ergotoxine (or the ergotamine) carries on the contraction for a longer time The search for Dr Moir's unnamed active principle will be followed with interest If its presence is confirmed, then the determination of the amount of alkaloid in ergot does not completely evaluate the drug

Several investigators have published results of their work on the colorimeter test, including M I Smith and Stohlman (5), Swanson, Powell, Stevens and Stuart (6), Powell, Schulze and Swanson (7), Wokes (8), Swoap, Cartland and Hart (9), J A C van Pinxteren (10), Allport and Cocking (11), Gerlough (12), Lozinski, Holden and Diver (13) and (14), and Smelt (15)

The author has tried the B P colorimeter test on several samples of ergot,

and compared results with those obtained by the Allport and Cocking modification In the B P test as devised by M I Smith, the standard consists of 1 cc of ergotoxine ethanesulphonate solution in water (containing 0 1 mg of anhydrous ergotoxine) to which is added 2 cc of a 1 in 800 solution of dimethylaminobenzaldehyde in 50% sulphuric acid v/v The resulting blue colors are matched in a colorimeter If the colors match, the sample contains 0 4% of alkaloids, calculated as ergotoxine

The B P method of extraction consists in taking 12 Gm of ergot in powder, defatting, and shaking the defatted powder with 120 cc of ether for 10 minutes Then add 0 5 Gm of light magnesium oxide diffused in 20 cc of water, and shake at intervals during 30 minutes Now add 1 5 Gm of powdered tragacanth, shake vigorously, filter through cotton, and transfer 100 cc, representing 10 Gm of ergot, to a separator The ethereal solution of the alkaloids is shaken with several portions of a 1% solution of tartaric acid, the ether removed by gentle heat and made up to 40 cc One cc of this solution represents 0 25 Gm of ergot When the B P method is followed on a hot day, there is difficulty in separating 100 cc of ethereal solution

Recently, Miss E M Smelt (15) has suggested a modification of the B P method of testing the fluidextract in order to prevent emulsification during the shaking with ether

> Five cc of the fluidextract are diluted with 25 cc of distilled water rendered slightly alkaline with 10% ammonia solution, and extracted with successive portions of 40, 35 30 and 30 cc of ether The first portion of ether should not be shaken too vigorously, but less care is needed in shaking the subsequent portions The ethereal solution is washed as directed in the B P, and then extracted five times with successive portions of 4 cc (or for strong liquids, 5 cc) of a 1% solution of tartaric acid After removal of ether the solution is adjusted to 20 cc or for strong fluidextracts, to 25 cc

Allport and Cocking have insisted on the use of pure anesthetic ether, to avoid oxidation of the alkaloids

The Allport-Cocking modification consists simply in adding a small amount of ferric chloride or ferric sulphate to the reagent Using a 10% solution of ferric chloride, 5 cc are diluted to 100 cc with distilled water The reagent is then mixed as follows

Dimethylaminobenzaldehyde	0 125	Gm
Sulphuric Acid, U S P	65	cc
Diluted Ferric Chloride solution	1	cc
Distilled water to make	100	cc

The advantage of this reagent consists in the full development of the color in about five minutes, even in the dark, so that prolonged exposure to light is unnecessary In following the B P test, the solution, after adding the reagent, is warmed to 45° before exposure to light, but this is not necessary in using the Allport-Cocking reagent, as the temperature rises to about 45° on mixing the liquids The solution should stand for at least 5 minutes before comparing the colors, in order to allow ample time for the color to develop The following results were obtained with six samples of ergot, against a fresh solution of ergotoxine ethanesulphonate

Sample	B P Reagent	Allport Cocking Reagent
1	0 170	0 171
2	0 210	0 191
3	0 082	0 073
4	0 100	0 090
5	0 145	0 134
6	0 236	0 222

(Results in Gm total alkaloids in 100 Gm ergot)

The use of ergotoxine ethanesulphonate as a standard raises the question as to whether that standard is uniform from time to time It seemed to be desirable to try to match this standard against a colored chemical solution For this purpose an ammoniacal solution of cupric sulphate in distilled water was prepared After numerous trials, it was found that a solution containing 0 67% of C P crystalline cupric sulphate or the equivalent amount of the desiccated salt matched a freshly prepared solution of ergotoxine ethanesulphonate containing 0 1 mg of anhydrous ergotoxine in 1 cc The similarity in color of the copper solution to the ergot solution treated with the B P reagent or the Allport-Cocking modification, is remarkably close It is best to match the colors in daylight when using a Bausch and Lomb Duboscq colorimeter The probable value of the use of a copper solution as a super-standard is seen in the following results In one set of experiments the same ergot samples were matched (*a*) against a freshly made B P ergotoxine solution treated with the B P reagent, and (*b*) against an ammoniacal copper sulphate solution containing 0 67% of C P crystalline cupric sulphate

Samples	B P Ergotoxine Solution and B P Reagent	Ammoniacal Cupric Sulphate Solution
1	0 170	0 162
2	0 210	0 168
3	0 082	0 074
4	0 100	0 080
5	0 145	0 126
6	0 236	0 199

Another set of experiments was made, replacing the B P reagent by the Allport-Cocking modification, using the same samples of ergot

Samples	B P Ergotoxine Solution and Allport Cocking Reagent	Ammoniacal Cupric Sulphate Solution
1	0 171	0 162
2	0 191	0 190
3	0 073	0 078
4	0 090	0 099
5	0 134	0 126
6	0 222	0 216

On the whole, these two sets of experiments show a fairly close agreement and suggest that the copper standard may have a useful function

It would be a distinct advantage if we could check up our ergotoxine standard against such a fixed standard, easily obtainable It would guard against using an ergotoxine salt or a solution of the same that had deteriorated The long-continued heat has delayed some of the experimental work that was planned, due to the

difficulty of handling the ether solutions on an aliquot basis These preliminary observations as to the use of copper sulphate as a check on the standard are offered in the hope that others may try it, and possibly improve on it

Recently, R Freudweiler (16) has suggested the use of a 2% solution of vanillin in concentrated sulphuric acid (free from nitric acid) in place of the B P reagent When 2 cc of the vanillin reagent are added gradually to 1 cc of an aqueous solution of the alkaloids of ergot, a purple color develops, which is stable for hours, and under the given experimental conditions, its intensity is proportional to the amount of alkaloid present Equimolecular proportions of ergotoxine, ergotamine and ergotinine are stated to give equal intensities of color Allport and Cocking (11) tried vanillin (and other aldehydes) in place of dimethylaminobenzaldehyde, but found none of them developed a color without exposure to bright light In trying out this reagent it was found that the temperature ran up quickly to 93° and in one case to 98° On adding the reagent to the ergotoxine solution surrounded by cold water, a temperature of 72° was reached A wine-red color was developed

A solution was then made of 2% vanillin in 65% v/v of concentrated sulphuric acid The color when fresh was bright golden yellow, but by the next day the bright gold effect had given way to a dull yellow On adding this solution to the ergotoxine, the temperature rose to 45–52°, without using precautions to keep the solution cool This temperature is not considered too high for the alkaloids The color of the solution was a beautiful purple But it was found a difficult color to match in the Duboscq colorimeter, either by daylight or artificial light, showing rose-red, and lacking the bluish or purplish tint of the ergotoxine solution The following figures give the results with the same samples of ergot as before, tested against a fresh solution of ergotoxine with the same reagent

Sample	2% Vanillin in 65% Sulphuric Acid v/v
1	0 148
2	0 167
3	0 069
4	Not tested
5	0 109
6	0 174

Combining all results into one table, the following figures make it easy to compare results

Sample	Sample and Ergotoxine Sol Treated with B P Reagent	Sample Treated with B P Reagent Compared with Cu Solution as Standard	Sample and Ergotoxine Sol Treated with Allport Cocking Reagent	Sample Treated with Allport Cocking Reagent Compared with Cu Solution as Standard	Sample and B P Ergotoxin Solution Treated with 2% Vanillin in 65% H_2SO_4 v/v
1	0 170	0 162	0 171	0 162	0 148
2	0 210	0 168	0 191	0 190	0 167
3	0 082	0 074	0 073	0 078	0 069
4	0 100	0 080	0 090	0 099	Not tested
5	0 145	0 126	0 134	0 126	0 109
6	0 236	0 199	0 222	0 216	0 174

(Figures represent Gm of total alkaloids in 100 Gm ergot)

In so far as I have used these reagents, I much prefer the Allport-Cocking reagent to vanillin The colors are easier to match, and this reagent has given satisfaction in the hands of many workers in several countries

It is to be hoped that the continued use of the Maurice I Smith colorimetric method, as modified by Allport and Cocking, will prove to be a trustworthy guide as to the potency of ergot since it affords a simple means of checking biologic assays There is need of further work on the relative values of results obtained by chemical and biologic methods of assay now in use The papers published by Lozinski, Holden and Diver (13) and (14) are a step in the right direction

BIBLIOGRAPHY

(1) Maurice I Smith, Reprint No 1390, *Public Health Reports*
(2) Frank Wokes *Pharm J*, 128 (1932) 206
(3) *Ibid* 127 (1931), 482
(4) Chassar Moir, *Brit Med J*, Part 1 (June 18, 1932), 1119
(5) Smith and Stohlman, *J Pharmacol & Exper Therap*, 43 (December 1931), 621
(6) Swanson Powell, Stevens and Stuart, Jour A Ph A, 21 (1932), 229
(7) Powell Schulze and Swanson, *Ibid*, 21 (1932), 1003
(8) Frank Wokes, *Quart J Pharm*, 4 (1931), 420
(9) Swoap, Cartland and Hart, Jour A Ph A, 22 (1933), 8
(10) J A C van Pinxteren, *Pharm Weekbl*, 68 (1931) 688
(11) Allport and Cocking *Quart J Pharm*, 5 (1932) 341
(12) Gerlough *Am J Pharm*, 103 (1931), 644
(13) Lozinski, Holden and Diver, *J Pharmacol & Exper Therap*, 42 (1931), 123
(14) Same authors *Pharm J*, 130 (1933), 137
(15) E M Smelt, *Ibid*, page 137
(16) R Freudweiler, *Pharm Acta Helv* 7 (1932), 116, 139, through *Quart J Pharm*, 6 (1933) 268

Laboratory of the
Upsher Smith Company
Minneapolis, Minn

YEAST EXTRACT IN PILL MAKING

Various yeast extracts are found to be suitable for pill making Ext faecis sicc (D A B VI) is used in conjunction with glycerinated water in pil arsen (0 001 Gm) pil creosoti (0 025 ml), and pil ferri redact (0 05 Gm) If the proportion of the powdered ingredients becomes too large for a satisfactory pill mass to be made with the dry extract, a small quantity of ext faec spiss (D A B VI) may be added For this purpose a mixture of equal weights of yeast extract, glycerin and water is kept ready and used as required, in this way the binding power of the dry extract is increased and a higher proportion of powders may be incorporated Examples include quinine hydrochloride and salol with equal weights of dry and moist extract of yeast The dry extract is suitable for preparing pills of ethereal oils, balsams, etc , and the pills are more soluble than when prepared with lanolin and kaolin etc Ext faec spiss or powdered yeast dried at 100° C may be used with the dry extract The powdered yeast is superior to liquorice powder as a binding agent, and pills made with it more readily disintegrate, owing to absorption of moisture with consequent swelling Examples quoted are for turpentine ((0 25 Gm), santal oil (0 5 Gm) and balsam of copaiba (0 5 Gm) with 4 Gm of dry extract and 8 Gm of powdered yeast for 100 pills If the pill formula already contains a soft extract, *e g*, extract of gentian the yeast extract may be omitted —R Ruf (*Pharm Weekbl*, 33 (1933) 880) —Through *Pharmaceutical Journal*

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts, Baltimore, Maryland

PHARMACOPŒIAS AND FORMULARIES

Anon
Summary of standards for chemical substances in the British Pharmaceutical Codex, 1934
Pharm J, 131 (1933) 652, 678

Anon
British Pharmaceutical Codex standards for surgical dressings
Pharm J, 131 (1933), 709

Casparis, P
Review of the Swiss Pharmacopœia V
Schweiz Apoth-Ztg, 71 (1933), 637, 653

APPARATUS AND MANIPULATIONS

Schwenke, B
New suppository mold
Pharm Tijdschr, 11 (1933) 105

PHARMACEUTICAL PREPARATIONS

Bleyer, B, *et al*
Influence of preservatives on enzyme action
Arch Pharm, 271 (1933) 539

Brandrup, Wolfgang
Ammonia liniment
Pharm Zentralh, 74 (1933), 749

Bukey, F S, and Rhodes, Phyllis
A practical enteric coating for the retail pharmacist
Jour A Ph A, 22 (1933), 1253

Chalmeta, A and C
Conservation of coca leaf preparations
Bull sci pharmacol, 40 (1933), 577

Lee, C O, and Hoch H C
A proposed formula for Belladonna ointment
Jour A Ph A, 22 (1933), 1255

Neugebauer, H
Methods for the investigation of homeopathic remedies
Pharm Weekbl 70 (1933), 1221

Pfister, A
Sterilization of urotropin solutions
Pharm Ztg, 78 (1933), 1228

Roberts, J C, and Lloyd, R V
Liq Cresol Saponatus B P, 1932
Pharm J, 131 (1933), 677

van Giffen, H J
Investigation of tablets
Pharm Weekbl, 70 (1933), 1270

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Anon
Dinitrophenol and accelerated tissue metabolism
J A M A, 101 (1933), 2122

Campbell, David, and Morgan, Thomas N
On the absorption of insulin from the intestinal tract
J Pharmacol & Exper Therap, 49 (1933), 450

Campbell, David, and Morgan, Thomas N
On the hyperglycæmic action of certain drugs
J Pharmacol & Exper Therap, 49 (1933), 456

Chen, K K, and Chen A Ling
The physiological action of the principles isolated from the secretion of the South African toad (*Bufo regularis*)
J Pharmacol & Exper Therap, 49 (1933), 503

Chen, K K, and Chen, A Ling
The physiological action of the principles isolated from the secretion of the Jamaican toad (*Bufo marinus*)
J Pharmacol & Exper Therap, 49 (1933) 514

Chen, K K and Chen, A Ling
A study of the poisonous secretions of five North American species of toads
J Pharmacol & Exper Therap, 49 (1933), 526

Chen, K K, and Chen, A Ling
Similarity and dis-similarity of bufagins, bufotoxins and digitaloid glucosides
J Pharmacol & Exper Therap, 49 (1933), 561

Cook, E Fullerton
Recent developments in pharmacopœial vitamin standardization
Am J Pharm, 105 (1933) 583

Fabre R
Permeability of the placenta to barbituric acid derivatives
J pharm chim, 18 (1933), 417

Higgins J A, and McGuigan, H A
The influence of caffeine on the effects of acetanilid

J Pharmacol & Exper Therap, 49 (1933) 466

Levine, Benjamin

Use of phenylmercuric nitrate in tinea and yeast infections of the skin Preliminary report

J A M A, 101 (1933) 2109

Levrat, Marcel, and Morelon François

Pharmacodynamic and toxicologic study of trypaflavine, rivanol and other acridine derivatives

Bull sci pharmacol, 40 (1933), 582

Magidson, O and Strukaw, I Th

Derivatives of 8-aminoquinoline as antimalaria preparations

Arch Pharm, 271 (1933), 569

Peabody, Wm A, and Neale R C

The pigeon as a hematopoietic test animal

Jour A Ph A 22 (1933), 1231

Plant O H, and Pierce I H

Studies in chronic morphine poisoning in dogs V Recovery of morphine from the tissues of tolerant and non-tolerant animals

J Pharmacol & Exper Therap 49 (1933), 432

BOTANY AND PHARMACOGNOSY

Dezani, S, and Borsalino-Semeria, A M

Digitalis Lanata, Ehrh, cultivated in Piedmont

J Soc Chem Ind, 52 (1933) 1035

Fischer Louis, and Lynn, E V

Licorice fern and wild licorice as substitutes for licorice

Jour A Ph A 22 (1933) 1225

Georgi, C D V, and Teik, G L

Valuation of tuba (Derris) root

J Soc Chem Ind, 52 (1933) 1035

Juul, K

Pharmacognostic observations on the Danish Pharmacopœia, 1933

Arch Pharm Chemi, 40 (1933), 641

McMurray, R L

Achillea Millefolium, Linné

Am J Pharm, 105 (1933), 573

Munesada T, and Hayashi, M

Pharmacognostic investigation of the roots of some *Cynanchum* species

J Pharm Soc Japan, No 621 (1933) 241

Nakaoki, T

Constituents of *Trifolium repens*

J Pharm Soc Japan No 621 (1933) 238

Rothea, F, and Niellous, F

Vegetable lecithin of soja

J pharm chim, 18 (1933), 443

Youngken, Heber, W, and Reed, Allan W

A new field of investigation in pharmacognosy The microscopy of glandular products

Jour A Ph A, 22 (1933), 1215

ALKALOIDS AND GLUCOSIDES

Aye, D

A volatile alkaloid of *Helvella esculenta*

Arch Pharm, 271 (1933), 537

Beal, George D, and Szalkowski, Chester R

Notes on the water of crystallization of quinine sulphate

Jour A Ph A, 22 (1933), 1219

Dey, B B and Pillay, P Parameswaren

Two new alkaloids and a neutral crystalline substance from the root of *Toddalia aculeata*

Arch Pharm, 271 (1933), 477

Dey B B and Lakshminarayanan S

Hedyotine, an alkaloid from the root of *Hedyotis Auricularia*

Arch Pharm, 271 (1933), 485

Dietzel R, and Steeger, O

Decomposition of alkaloids in aqueous solution particularly with reference to sterilization

Arch Pharm, 271 (1933), 521

Feng, C T, and Read, B E

Qualitative tests for ephedrine and its derivatives

Jour A Ph A, 22 (1933) 1241

Gant, V A

Studies of the effect of ultraviolet rays on nicotine

J Pharmacol & Exper Therap 49 (1933), 408

Keimatsu I

Separation and estimation of the alkaloids in tincture of opium by the method of the U S Pharmacopœia

J Pharm Soc Japan, No 621 (1933), 247

Leger, E

Review of the chemistry of the glucosides of digitalis

J pharm chim 18 (1933) 482

Raymond Hamet and Millat L

The *Mitragina* and their alkaloids

Bull sci pharmacol, 40 (1933), 593

Solacolu, Th, and Welles, Ecaterina

Contributions to the distribution of saponins in the plant kingdom

Arch Pharm 271 (1933), 470

Wunschendorff H and Valier P

Retamine, an alkaloid from *Retama Sphaerocarpa*

Bull sci pharmacol, 40 (1933), 601

ESSENTIAL OILS

Clevenger, J F
Report on the determination of volatile oils in spices
J Assoc Offic Agric Chem, 16 (1933), 557

OILS, FATS AND WAXES

Canals, E, and Ramahenina Ranaivo
Surface tension of medicinal and food oils
J pharm chim, 18 (1933), 438
Haines, R T M, and Drummond, J C
Properties of halibut-liver oil
J Soc Chem Ind, 52 (1933), 974
Marcille, R
Determination of the bromine index of oils
J Soc Chem Ind, 52 (1933) 975
Sheej, E J
Effect of the conditions of storage on the vitamin-D potency and other properties of cod liver oil
J Soc Chem Ind, 52 (1933) 974

ANALYTICAL METHODS AND RESULTS

Baggesgaard Rasmussen, H, and Reimers, F
Acid-base titrations in alcohol-water mixtures
Dansk Tids Farm, 7 (1933), 164, 225
Carey, M W, Green, L W and Schoetzow, R E
A method for the determination of minute amounts of aldehydes in ether
Jour A Ph A, 22 (1933), 1237
Fleury Paul, and Paris, Raoul
Comparative action of periodic acid on glycerophosphoric acids (α and β) and a new method for the estimation of glycerophosphates
J pharm chim, 18 (1933), 470
Griffon Henri, and Buisson, Maurice
Study of the mechanism and technic of the estimation of arsenic by the Cribier method
J pharm chim, 18 (1933), 422
Michels, L, and Tougarinoff, B
Estimation of iodides by the method of Andrews
J pharm Belg, 15 (1933), 845
Radley, J A
Fluorescence analysis of pharmaceutical products
Chem & Drug, 119 (1933), 340, 643
Stamier, Carl, and Massart, Jean
Estimation of formic acid in the presence of acetic acid
J pharm Belg, 15 (1933) 869, 891
Warren, L E
Solubilities of some organic drugs and their application in drug analysis
J Assoc Offic Agric Chem, 16 (1933), 571

INORGANIC CHEMICALS

Alyea, H N, and Pace, J
Inhibitors in the decomposition of hydrogen peroxide by catalase
J Am Chem Soc, 55 (1933), 4801
Feldhoff, R A
Small scale manufacture of colloidal silver
Pharm J 131 (1933), 677
Negishi, G R, Donnally, L H, and Hildebrand J H
Solubility XIII The solubility of Iodine in certain solvents
J Am Chem Soc, 55 (1933), 4793
Schmidt, Jacob E, and Krantz John C Jr
The detection of small quantities of carbon monoxide in medicinal oxygen
Jour A Ph A, 22 (1933), 1222
Schmidt, Jacob E, and Krantz, John C, Jr
A note on the water content of magnesium oxide
Jour A Ph A, 22 (1933), 1245

ORGANIC CHEMICALS

Fischer, R
Identification of local anesthetics
Arch Pharm, 271 (1933), 466
Hargreaves, George W, and Nixon, H W
The identification of some hypnotics of the barbituric acid series
Jour A Ph A 22 (1933), 1250
Tonn, O
Course of the reaction in the purification of ether for narcosis by the sodium method
Pharm Zentralh, 74 (1933), 765
van Zijp, C
Contribution to the microchemistry of antipyrine
Pharm Weekbl, 70 (1933), 1243

"After all the argument and disputation, after all the theory and doctrine after all the study and analysis, the conclusion of the whole matter is this that a professional does not live unto himself alone and what he does carries an influence far and wide"

EPHEDRINE SALTS OF FATTY ACIDS AS SOLUBILIZING AGENTS IN MINERAL OIL SYSTEMS

BY E E MOORE *

It is well known that many alkaloids which are insoluble in mineral oil dissolve in mixtures of mineral and vegetable oils The importance of the free fatty acids present in the latter has not been fully recognized A good grade of olive oil will contain about one per cent free fatty acid Because of its alkaline nature the alkaloid can combine with this free acid to form a salt The latter is not only much more soluble than the original alkaloid in mineral oil but the resulting solution has much greater solvent power than the original oil In this work the formation of ephedrine salts of fatty acids and the solvent action of their solutions in mineral oil were studied

The purpose of this investigation was to prepare a mineral oil solution of ephedrine, a secondary aliphatic amine, and metaphen, an acidic organo mercurial

Solutions of ephedrine and acidic organo mercurials in vegetable oils may be readily prepared Investigation indicated that these were not true solutions, but colloidal suspensions They exhibit the characteristic Tyndall beam, and t e interfacial tension between the oil solution and water is lowered so that emulsions can easily be formed

These facts suggest that the system may be stabilized by a compound formed between the ephedrine and some substance present in the vegetable oil, presumably the free fatty acid The system would then consist of oil as the continuous phase, the amine salt of the mercurial as the discontinuous phase, and the amine soap at the interface as the stabilizing agent

Solubilities were studied in olive oil containing one per cent free fatty acid, neutral olive oil, and neutral methyl and ethyl esters of the fatty acids of olive oil Ephedrine is soluble in all the above oils, while metaphen and metaphedrin, formed from one mol each of ephedrine and metaphen, are insoluble

An excess of ephedrine was added to suspensions of metaphen and of metaphedrin in the different oils Only in the case of olive oil did solutions result The rate of solution was much more rapid with the metaphedrin than with the metaphen, which indicates that the amine salt of the organo mercurial must form before the latter can dissolve

When one per cent of oleic acid was added to the neutralized oils, they behaved like the olive oil Solutions resulted under the same conditions

Mineral oil was then tested When one per cent of oleic acid was added, solutions resulted as readily as with olive oil Further work showed that the oleic acid content could be reduced Preparations containing 0 1% oleic acid, 1 0% ephedrine, and 0 04% metaphen show no signs of separation after two years

Other acidic organo mercurials such as mercurosal, merthiolate and mercurophen were found to behave like metaphen in this respect Acidic organo metallic compounds other than mercurials were used Other amines which form oil-soluble soaps, such as the ethanolamines (1) can be used in place of ephedrine The unsaturated fatty acids of high molecular weight, oleic and erucic, give the most stable systems

* Abbott Laboratories North Chicago Ill

The rate of solution was estimated by the color development, while completeness of solution and stability were determined by analysis for mercury (2)

The most satisfactory method of preparation consists in first forming the ephedrine salts of the mercurial and of the fatty acid and then stirring these into the oil

The concentration of mercurial which may be obtained is limited by the requirement that on an average four mols of the ephedrine salt are required for each mol of the mercurial amine salt Stable preparations containing 1 0% of the latter have been made

LITERATURE CITED

(1) A L Wilson, *Ind Eng Chem*, 22 (1930), 143
(2) Moore and Shelberg, *Ind Eng Chem, Analyt Edit*, 4 (1933), 224

A COMPARISON OF THE EFFECT OF PHENYL ETHANOLAMINE AND EPHEDRINE ON NASAL MEMBRANES *

BY T B GRAVE AND W G CHRISTIANSEN

Ephedrine solutions are widely used for application to nasal membranes, and Tainter (*J Pharmacol Exper Therap*, 36 (1929), 52) described the satisfactory behavior of phenyl ethanolamine on nasal membranes It was, therefore, of interest to prepare phenyl ethanolamine for comparison with ephedrine The phenyl ethanolamine was prepared by methods described in detail below and was tested as the hydrochloride in 1, 2 and 4% aqueous solution and as the oleate in mineral oil solution using in both cases corresponding ephedrine solutions as controls The solutions of the oleates were prepared by dissolving 5 Gm of the base with a chemical equivalent quantity of oleic acid in mineral oil so that the total volume was 100 cc The tests consisted of applying these solutions to the nasal membranes of both horses and human beings and observing the degree and duration of blanching and recording in the experiments on human beings the relief As a result of these tests we conclude that there is little difference between the phenyl ethanolamine and ephedrine

EXPERIMENTAL

Preparation of ω-Aminoacetophenone—$C_6H_5\,CO\,CH_2Cl + (CH_2)_6N_4 \longrightarrow C_6H_5\,CO\,CH\,[(CH_2)_6\,N_4]\,Cl$

$C_6H_5\,CO\,CH\,[(CH_2)_6\,N_4]\,Cl + 3HCl + 12C\,H_5OH \longrightarrow C_6H_5CO\,CH_2\,NH_2\,HCl + 3NH_4Cl + 6CH_3\,(OC_2H_5)_2$

The method of Mannich and Hahn *Ber*, 44 (1911), 1542, was used

23 Gm of chloracetophenone was dissolved in 140 cc of chloroform and stirred with 21 Gm of hexamethylene tetramine until complete solution took place (two hours) After standing over night the addition-reaction was complete, the mass of glistening crystals was filtered off and washed with cold chloroform Yield 40 Gm This product was 'alcoholyzed' by a mixture of 320 cc of absolute alcohol and 40 cc of concentrated hydrochloric acid After standing 72 hours at room temperature, the precipitated ammonium chloride was filtered off and the alcoholic solution concentrated *in vacuo* The crude ω-aminoacetophenone hydrochloride which separated

* Section on Practical Pharmacy and Dispensing Madison meeting 1933

was recrystallized from 10 cc of hot water Yield 6 75 Gm , melting at 190–192°, with decomposition

Catalytic Hydrogenation to Phenyl Ethanolamine—$C_6H_5CO\,CH\,NH_2\,HCl \longrightarrow C_6H_5\text{-}CHOH\,CH_2\,NH\,HCl$

0 2 Gm of platinum oxide (prepared by the method of Adams and Shriner, Org Syn , VIII 92) was reduced by shaking with hydrogen in aqueous suspension The platinum black was filtered off and added to the solution of 6 75 Gm of ω aminoacetophenone hydrochloride in 225 cc of redistilled alcohol and 12 5 cc of conc HCl Absorption of hydrogen took place at the rate of 2 cc per minute When 970 cc had been taken up, the reaction was stopped, theoretical for 1 mol 963 cc The filtrate from the platinum was evaporated to dryness *in vacuo* The residue was twice recrystallized from absolute alcohol ether, yield, 4 31 Gm melting point 165–168° with decomposition The composition of the compound was verified by analysis of its chloroplatinate

0 2 Gm of the hydrochloride was dissolved in 2 cc of absolute alcohol containing 0 25 cc of HCl and treated with 3 cc of 10% aqueous chloroplatinic acid The orange precipitate was washed with ice cold alcohol and dried at 105° Yield 0 29 Gm melting point 203–204° with decomposition

Analysis

Found Pt. 28 45%
Calcd for $(C_8H_{11}ON)_2\,H_2PtCl_6$ 28 53%

Preparation of the Oleate—In order to avoid all possibility of decomposition, the free base was prepared by the action of silver oxide and converted without isolation to the oleate 4 0 Gm of the hydrochloride was dissolved in alcohol and an excess of freshly precipitated silver oxide stirred in until the formation of silver chloride was complete The filtrate was evaporated *in vacuo* with the theoretical quantity of oleic acid (6 54 Gm) until free of alcohol

The neutral oleate thus obtained was dissolved in liquid petrolatum for the physiological tests

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E R Squibb and Sons and we gratefully acknowledge their assistance

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES
E R SQUIBB AND SONS
BROOKLYN N Y

VARIATIONS IN HAND-MOLDED HYPODERMIC TABLETS *

BY S WALLEY BOWER

During the past year the question of Variations in Hand-Molded Hypodermic Tablets arose, which suggested the following observations

(*a*) What is the error in the manufacture of these tablets as based on the theoretical?

(*b*) What variations take place when the molding of the same lot of tablets extends over a period of several days?

(*c*) What is the relationship of the percentage error of the total count of the entire lot (as an average) with the error of tablets when weighed in small subdivisions?

---

* Section on Practical Pharmacy and Dispensing A PH A Madison meeting 1933

(*d*) What is the difference in error in the molding of one-half grain and one-fourth grain tablets?

Four lots of one-half grain morphine sulphate tablets were selected at random Each lot was molded by the same operator This person has been molding tablets for ten years and is experienced in the manufacture A steel plate containing 200 perforations was used in the making, thus turning out 200 tablets at each operation

The formula was based on the following Morphine sulphate, U S P 100 ounces, milk sugar, 16 ounces, making a total weight of 116 ounces, or 50,750 grains Thus, each 100 tablets was calculated to weigh 58 grains, the mixture theoretically yielding 87,500 one-half grain tablets

Inasmuch as one-fourth grain tablets are made from a mold the thickness of which differs from that of one-half grain tablets, these two sizes are considered separately

Four lots of one-fourth grain morphine sulphate tablets were selected These were based on the following formula Morphine sulphate, U S P, 100 ounces, milk sugar, 88 ounces, total weight, 188 ounces, or 82,250 grains Each 100 tablets in this instance weighed 47 grains, producing a total theoretically of 175,000 tablets

The molding extended over a period of days, as shown in the following table

TABLE I —TABLETS MOLDED EACH DAY

Days	Lot 1	Lot 2	Lot 3	Lot 4
		One-Half Grain Tablets		
1	9 000	27,000	14 000	4,000
2	22,000	32,000	24,000	23,000
3	26 000	29,124	30,000	28 000
4	24 000		20,887	26,000
5	9,802			7,590
Total	90 802	88,124	88,887	88,590
		One-Fourth Grain Tablets		
1	34,000	18,000	30,000	20,000
2	34,000	30 000	36 000	33 000
3	33 000	34,000	36,000	30,000
4	33,000	34,000	40 000	33 000
5	33 000	34,000	35 308	33,000
6	7,662	25,713		29,008
Total	174 662	175 713	177 308	178 008

TABLE II —ERROR IN YIELD BASED ON THE THEORETICAL

Lot	Yield	Theoretical	Over or Under Theoretical	Per Cen
		One-Half Grain Tablets		
1	90 802	87,500	3 302 over	96 40
2	88,124	87,500	624 over	99 49
3	88,887	87,500	1 387 over	98 44
4	88 590	87,500	1 090 over	98 77
		One-Fourth Grain Tablets		
1	174,662	175 000	338 under	100 19
2	175,713	175 000	713 over	99 59
3	177 308	175,000	2 308 over	98 70
4	178,008	175 000	3 008 over	98 31

In this connection, during several days' work, the human element and physical condition varying in the operator must be taken into consideration Fatigue might develop late in the day, which would have a tendency to vary the hand pressure in the filling of the molds and slow down the production Also, the person might work a longer period of time one day than another on this work This variation may be noted in Table II

The tablets were allowed to air dry for two days From each lot manufactured, 5000 tablets were counted and weighed, this being considered as a representative sample The percentage variation from the theoretical was computed Also, this percentage variation was compared with the average percentage variation of the entire lot, and the difference noted

TABLE III —PERCENTAGE VARIATION OF 5000 TABLETS

Lot	Weight of 5000 Tablets in Grains	Per Cent Variation from Theoretical	Average Per Cent Variation of Entire Lot	Per Cent Variation from Average
		One Half Grain Tablets		
1	2768	95 45	96 40	0 95—
2	2855	98 46	99 49	1 03—
3	2846	98 15	98 44	0 29—
4	2809	96 87	98 77	1 90—
		One Fourth Grain Tablets		
1	2335	99 39	100 19	0 80—
2	2328	99 10	99 59	0 49—
3	2292	97 55	98 70	1 15—
4	2353	100 15	98 31	1 84+

TABLE IV —VARIATIONS IN 500 TABLETS FROM THEORETICAL

	Lot 1		Lot 2		Lot 3		Lot 4	
	Wt of 500 Tablets in Grains	Per Cent	Wt of 500 Tablets in Grains	Per Cent	Wt of 500 Tablets in Grains	Per Cent	Wt of 500 Tablets in Grains	Per Cent
			One Half Grain Tablets					
1	275 6	95 02	283 7	97 84	279 1	96 23	282 6	97 45
2	282 8	97 50*	288 2	99 38	284 7	98 18	274 7	94 72
3	282 5	97 42	291 5	100 54	280 1	96 58	288 8	99 60
4	278 9	96 12	279 8	96 50**	286 7	98 86	283 5	97 75
5	268 2	92 47**	281 3	97 00	280 2	96 61	289 1	99 71*
6	274 9	94 78	294 0	101 38*	286 6	98 85	274 5	94 65
7	274 7	94 74	289 4	99 80	278 6	96 07**	274 6	94 70
8	278 1	95 88	292 0	100 70	293 8	101 33*	284 7	98 17
9	279 9	96 51	291 7	100 57	292 9	101 02	282 7	97 59
10	272 4	93 94	283 5	97 76	284 3	98 02	273 8	94 43**
			One Fourth Grain Tablets					
1	228 8	97 35	232 4	98 89	224 4	95 48	229 8	97 77**
2	235 9	100 39	234 3	99 68	228 4	97 19	237 2	100 95
3	236 0	100 40	227 3	96 73**	232 1	98 76	237 5	101 07
4	233 6	99 41	234 6	99 82	230 3	98 00	230 1	97 92
5	236 5	100 64*	234 1	99 60	231 5	98 53	232 2	98 79
6	228 4	97 20**	234 6	99 84	231 2	98 40	232 6	98 97
7	236 3	100 54	228 4	97 20	233 2	99 08*	234 3	99 72
8	233 5	99 36	234 1	99 61	223 1	94 92**	233 9	99 54
9	233 3	99 28	234 2	99 67	227 9	96 98	242 8	103 34
10	233 5	99 36	234 7	99 87*	230 3	98 01	243 1	103 47*

* High ** Low

To determine what variations occurred in 5000 tablets, these were divided into lots of 500 tablets The subdivisions were weighed and the percentage variation calculated from the theoretical

The theoretical weight of the one-half grain tablets was 290 grains, that of the one-fourth grain, 235 grains

As it was desired to note the greatest variation that could be found in each lot, the high and the low 500 tablets of each of these was now divided into five parts of 100 tablets each and weighed From these weighings, the percentage error was computed and tabulated This was based on the theoretical that 100 tablets of half-grain strength weighed 58 grains and 100 tablets of one-fourth grain strength, 47 grains

TABLE V —VARIATIONS IN THE HIGH AND LOW OF 500 TABLETS

	Lot 1		Lot 2		Lot 3		Lot 4	
	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent
			One-Half Grain Tablets					
High								
A	56 75	97 84	58 89	101 53*	58 91	101 54*	57 72	99 51
B	57 02	98 31*	58 74	101 27	58 69	101 20	58 40	100 68*
C	56 41	97 26	58 69	101 19	58 66	101 14	57 67	99 43
D	56 37	97 19	58 84	101 45	58 69	101 20	57 21	98 63
E	56 84	98 00	58 67	101 16	58 66	101 14	58 07	100 12
Low								
A	53 64	92 49	55 83	96 27	55 71	96 05	54 53	94 03**
B	53 60	92 41	55 83	96 27	55 59	95 84**	54 77	94 43
C	53 72	92 62	55 82	96 24	55 70	96 03	54 68	94 27
D	53 55	92 33**	55 63	95 92**	55 73	96 08	55 03	94 88
E	53 66	92 52	56 10	96 72	55 66	95 97	54 83	94 53
			One Fourth Grain Tablets					
High								
A	47 19	100 40	46 93	99 85	46 47	98 86	48 55	103 30
B	47 33	100 70	47 06	100 13*	46 58	99 10*	48 64	103 50
C	47 50	101 06*	46 65	99 49	46 42	98 77	48 70	103 63*
D	47 09	100 17	46 80	99 57	46 39	98 70	48 32	102 80
E	47 06	100 15	46 87	99 72	46 47	98 86	48 61	103 43
Low								
A	45 73	97 29	45 37	96 53**	44 63	94 96	46 00	97 88
B	45 70	97 22	45 52	96 85	44 53	94 69	45 90	97 65
C	45 90	97 65	45 42	96 63	44 57	94 83	45 90	97 65
D	45 32	96 43**	45 43	96 65	44 47	94 63**	46 05	97 98
E	45 54	96 90	45 37	96 53	44 66	95 02	45 76	97 36**

* High
** Low

The figures in the above columns represent the greatest and least deviation from the required standard as found in a representative sample of 5000 tablets taken from each lot It is quite sufficient that these figures may be considered in basing an average Consulting the above table, the greatest and least variations of one hundred tablets may be noted By subtracting the low figure from the high, the

total variation in weight of each separate lot may be determined This represents the variation which may be expected and caused by the difference of hand pressure in the filling of the molds by the operator

TABLE VI —EXTREMES OF VARIATION

	Lot 1		Lot 2		Lot 3		Lot 4	
	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent	Wt of 100 Tablets in Grains	Per Cent
				One Half Grain Tablets				
High	57 02	98 31	58 89	101 53	58 91	101 54	58 40	100 68
Low	53 55	92 33	55 63	95 92	55 59	95 84	54 53	94 03
Variation	3 47	5 98	3 26	5 61	3 32	5 70	3 87	6 65
				One Fourth Grain Tablets				
High	47 50	101 06	47 06	100 13	46 58	99 10	48 70	103 63
Low	45 32	96 43	45 37	96 53	44 47	94 63	45 76	97 36
Variation	2 18	4 63	1 69	3 60	2 11	4 47	2 94	6 27

The results of the weighings thus place the variations of the tablets within certain limits These limits may now be assumed to represent the extreme limits of error over or under the theoretical, and within which the tablets of each lot occur The following table shows this as percentage error

TABLE VII —EXTREMES OF VARIATION FROM THEORETICAL

	Lot 1 Per Cent Error	Lot 2 Per Cent Error	Lot 3 Per Cent Error	Lot 4 Per Cent Error
	One Half Grain Tablets			
High	1 69−	1 53+	1 54+	0 68+
Low	7 67−	4 08−	4 16−	5 97−
	One-Fourth Grain Tablets			
High	1 06+	0 13+	0 90−	3 63+
Low	3 57−	3 47−	5 37−	2 64−

SUMMARY

There does not appear to be any fixed ratio between the percentage error of the entire lot of these tablets, taken as a single unit, and the percentage error of the component subdivisions Several weighings of small quantities of tablets must be made to base an average However, the percentage error of the entire lot may serve as a guide Too large a percentage error, that is, too great an over or under yield in the total number of tablets of any single lot, should convey the idea that in the weighing of the subdivisions some of these might be found to be considerably over or under in strength

The variation is similar in both the one-half grain and the one-fourth grain tablets

The variations appear to be reasonable, when the nature of the work is considered, and to fall within reasonable tolerances Therefore, the present tolerances for hypodermic tablets should not be lessened with any new or proposed changes in the law

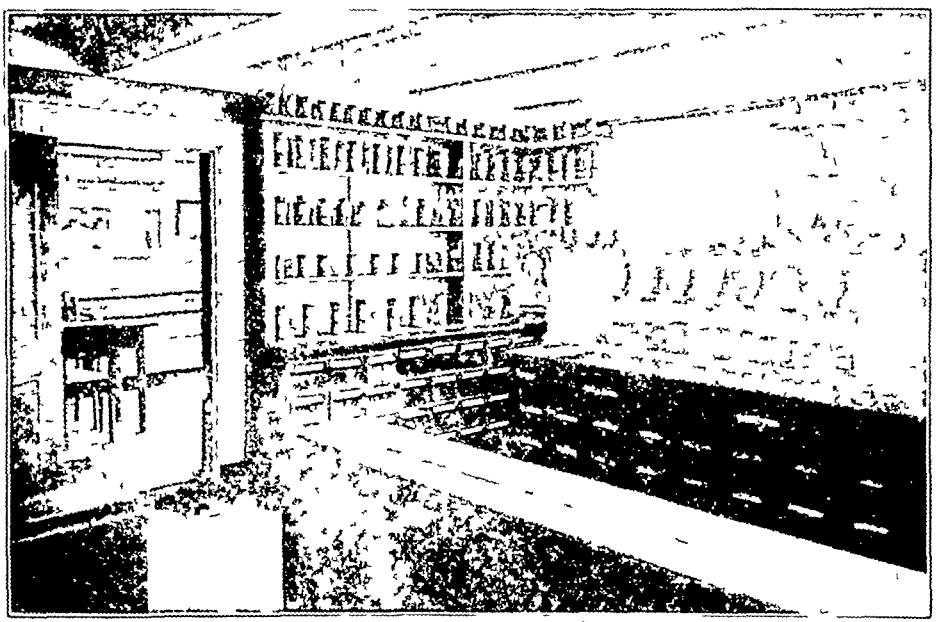
ANALYTICAL AND CONTROL LABORATORY,
DIRECT SALES COMPANY, INC,
BUFFALO, NEW YORK

HENRIK IBSEN—PHARMACIST *

BY LOUIS H RODDIS, COMDR (M C), U S NAVY

Most critics would probably agree that the dramatist next in rank after Shakespeare was the great Norwegian poet, Henrik Ibsen It is of interest to pharmacists, particularly to those in this section of the United States where there are so many of Norse descent, that Ibsen was apprenticed to a pharmacist in Grimstead, Norway, and spent from his fifteenth to his twenty-first year in a drug store

Henrik Ibsen was born March 20, 1828, at Skien, Norway There was some admixture of Danish and German blood in his ancestry His family belonged to the petty aristocracy of clergymen, sea captains, professional men and small land-



Courtesy of the American Scandinavian Foundation

Fig 1 —The Ibsen Museum—The Apothecary s Shop—Grimstead Norway

holders His father was early impoverished and at the age of fifteen he had to earn his own living He originally had intended to study medicine but began as an apothecary's assistant in Grimstead where he remained for six years The building where he worked is now an Ibsen Museum The shop is not unlike many European shops, with narrow counters, rows of shelves and drawers reaching to the ceiling and filled with labeled bottles On the prescription desk are scales, mortar and pestle Many of the prescriptions he copied and filled and notes he made are preserved under a glass case and here are preserved the poet's spectacles and inkwell The drawer is shown in which he wrote the date 15/4/1850, the day before he left Grimstead for Christiania to prepare for entrance into the medical school of the University

* Section on Historical Pharmacy Madison meeting 1933

There is a little room in the shop where he lived, so that at night he would be available in case it were necessary to prepare an emergency prescription Here he did most of the miscellaneous reading and studying that formed the basis of his education for he was unable to carry out his ambition to study medicine or even enter the University A paper dated September 3, 1850, and found here showed that he failed in his entrance examinations in Greek and mathematics and his general standing was low While here at Grimstead he made some friendships with young men who exerted some influence over his early career and he also had a love affair with a servant girl, a woman ten years older than himself, by whom he had an illegitimate child Here, too, he wrote his first play "Cataline "

Fig 2—Ibsen Bust Como Park St Paul, Minn

Although when he left Skien, April 16, 1850, he severed his connection with pharmacy, Ibsen's general interest in medical subjects is shown in a number of his works, notably in two of his dramas, ' Brand" and "An Enemy of the People " In the former syphilis forms the central theme, and in the latter a physician, Dr Stockman, draws attention to the fact that certain natural springs of medicinal waters to which the town owes its fame and prosperity are infected and harmful, as a result, he is declared to be a public enemy by his fellow townsmen and driven from the community

Ibsen died May 23, 1906, at Christiania known to the whole world as one of the greatest figures in all modern literature

It must be remembered that two other great literary men, John Keats and O Henry, were trained in pharmacy and the great name of Dante was inscribed in the list of apothecaries of Florence

---

"Detection of murder by poison will be made more sure by a new and accurate method of analyzing human blood to detect and estimate extremely small quantities of alkaloid drugs such as cocaine, strychnine and morphine The new technique, devised by Dr Burnham S Walker and Elizabeth W Walker, of Evans Memorial and Boston University School of Medicine, will detect six parts of drugs in one hundred thousand parts of blood It will also be used in gaging the proper dose of these powerful drugs in legitimate medicine "—*Science*

' Two familiar green aniline dyes are effective in combating and subduing some of the common skin infections that are due to fungi These dyes, malachite green and brilliant green, were found to be outstanding in killing action, far surpassing all others tested, including aniline violet, fuchsin basic and gentian violet "—Dr A McCrea in *Science*

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note 'The timely subject of Prof Eby's paper, which follows, is of great interest to all engaged in teaching in colleges of pharmacy He has covered the visual aids in pharmacognosy, giving information regarding different types and makes of apparatus, in a way that will be helpful to all teachers of the subject The Editor hopes that similar papers on visual aids in other subjects will be presented at our Teachers' Conference —C B JORDAN, *Editor* "

VISUAL INSTRUCTION IN PHARMACOGNOSY

BY FRANK H EBY *

During the last few years visual instruction has commanded the attention of many educators, and many institutions have made careful studies on this form of instruction and its value as an aid in teaching Instructors in the field of science have long recognized its value and many consider it one of the most important educational forces at their command Where careful studies have been made to determine its value, results indicate that there is a definite increase in learning for students who have the advantages of visual instruction as compared to the learning of students having the ordinary forms of class room instruction Recently a number of educational institutions have established departments of Visual Education which are equipped with all types of projection apparatus and slide and film libraries In most cases these departments have been established only after careful studies have indicated that visual instruction is a sound educational practice Improvements in projection devices and the application of new and improved methods in photography have been responsible for much of the progress which we have witnessed in this field

The importance of visual instruction has been emphasized very definitely during the last few years, however, this form of instruction has been an important part of the educational program in many professional schools for a long time The many developments which have taken place in this field would seem to justify a brief review of the possible applications of visual instruction in the teaching of Pharmacognosy

Most teachers of Pharmacognosy are using visual aids but they have been confronted with the problem of preparing or securing suitable material Very few if any of the organizations which sell or rent visual aids offer satisfactory material for this course and in order to develop good collections of slides and films, instructors have found it necessary to prepare most of the material which they use In many cases instructors have used their personal photographic and other equipment in preparing material for visual instruction This condition has been relieved since photographers' supply houses are offering their services for the preparation of slides and films, a service that is very valuable to the instructor who, through lack of time or facilities cannot prepare his own material

The instructor of Pharmacognosy occupies a position in which there are many

* Temple University

opportunities for visual instruction A variety of modern projectors and an almost unlimited field from which to select valuable material make it possible for the instructor with some initiative to develop a varied program which will do much to vitalize the course

There are five types of projection apparatus available for the teaching of Pharmacognosy The Lantern Slide Projector, Opaque Projector, Film Strip or Slidefilm Projector, Micro-Projector, and the Motion Picture Projector Each of these involves different projection principles consequently different material is required for the use of each machine The interest and initiative of the instructor will determine the character of the program which he may build around any one or several of these devices

The Lantern Slide Projector is the most widely used and certainly one of the most valuable projectors for use in the class room Since it is possible to prepare lantern slides on any subject that can be photographed there is practically no limit to its use An excellent example of the value of the lantern slide as an aid in teaching Microscopic Pharmacognosy has been demonstrated by George H Needham, of New York, who has prepared a number of photomicrographic lantern slides with the approval of Professor Ballard of Columbia University Each slide contains from one to four photomicrographs showing typical fields and identifying elements in important powdered drugs Slides of this type are a very important factor where the instructor wishes to aid the student in the correct identification of microscopic elements or where time does not permit the student to make a thorough study of an important drug in the powdered form A number of instructors have developed excellent collections of slides showing medical plants, their natural habits and their cultivation There are, however, very few good collections of lantern slides showing the various phases of Commercial Pharmacognosy, a field which offers a wide variety of subjects on which lantern slides may be prepared Where the instructor wishes to prepare lantern slides showing drawings, tracings or diagrams, Tracelene, a recently developed product, enables one to prepare quickly and inexpensively lantern slides of good quality Special glass and solutions used for preparing glass for latern slide drawings or tracings does not give the best results

The opaque projector permits the showing on a screen, pictures of all kinds of objects approximating flatness Photographs, pictures from books and periodicals, and drawings can be shown with this projector without any special preparation of the material The operation is very simple and the results satisfactory

The Film Strip, Film Slide or Slidefilm Projector is designed for showing pictures printed on standard motion picture films Two general types of projectors are being used One, a special machine designed for showing film strips only, the other, a special unit which may be attached to most of the standard lantern slide projectors In the preparation of film strips such materials as camera pictures, photographs, drawings, half-tones from books or anything that can be photographed may be used Pictures may be hand-colored and captions may be inserted with each picture The Society for Visual Education and other producers and distributors of visual aids will prepare film strips from your own material, placing as many as two hundred pictures on a single strip The advantage in using the film strip is the low cost per picture which permits the instructor to use a

greater variety of pictures or more completely picturize a subject Where visual instruction is used to a limited extent the film strip does not possess any advantages over the lantern slide

The Micro-Projector affords a means of direct projection of mounted specimens, a phase of teaching, especially in the laboratory that is of ever-increasing importance This projector makes it possible for the instructor of Pharmacognosy to point out to large groups many important details in a microscopic specimen, thus assuring more uniform and understandable assignments for student laboratory work It permits the instructor to differentiate the microscopic characteristics of authentic drugs and common adulterants or substitutes, thus making it possible to demonstrate certain microscopic sections which time would not otherwise permit the student to study

The Motion Picture Projector is the latest projection device to be used successfully in the class room In order to derive the full value of good motion picture photography a projector of good quality must be used Many excellent projectors are available for both the 35-millimeter and 16-millimeter films Most of the educational pictures which are now being used are supplied in both widths although many instructors prefer the narrow width films because they can be used in the more compact portable projector Since the introduction of sound motion pictures there have been a number of improvements in projection devices and the disc type unit which was first used in sound motion picture projection has been replaced in many instances by the more satisfactory sound-on-film projector

Within the last several years we have witnessed the remarkable development of the motion picture as an aid in teaching, and pictures dealing with specific themes have become a part of the teaching program in a number of institutions There is a wide range of subjects covered in these new films including Botany, Zoology, physics, chemistry, mathematics and music Their scientific character would seem to indicate that the motion picture can be used in almost any field of instruction A thorough knowledge of the uses of the many devices of photography including microscopic motion pictures, time-lapse photography, telescopic photography, animated diagrams and sound recording makes it possible to portray the important details of many subjects which cannot be satisfactorily portrayed by any other means

In considering the motion picture as an aid in teaching Pharmacognosy both silent and sound pictures could be employed and the subjects covered may include Lectures by outstanding educators, pictures protraying the various procedures employed in the preparation of crude drugs for pharmaceutical commerce, and pictures showing important drug industries such as the Opium, Cinchona and Spice industries and probably many others A few instructors in Pharmacy Schools have produced some very good motion picture films which they use in their own teaching programs and it is possible that others will produce some excellent films in the future However, what I have in mind, primarily, is the production of films of outstanding character and scope which cannot be produced by the individual instructor because of the expense and the lack of proper facilities Films of this type should be produced by skilled technicians under the direction of a capable staff of educators and then be made available for distribution to any School of Pharmacy that may wish to use them While I am interested in the motion pic-

ture as an aid in teaching Pharmacognosy, I believe there are many opportunities for using this type of visual aid in teaching other subjects in the Pharmacy School Curriculum The educational films which have been produced by the Erpi Picture Consultants are fine examples of what can be done with scientific material if the latest technical methods are employed and the production of the films is supervised by a capable staff

At this time I would like to suggest that some consideration be given to the idea of establishing a film library in the new Pharmacy Building at Washington No provisions have been made for a film library but I have been informed that there is ample space If worth-while educational films portraying American Pharmacy are to be produced, and I believe they will be eventually, it seems that the Pharmacy Headquarters would be the logical depository and center of distribution for these films Pharmacognosists would certainly play an important part in the development of a library of this kind and I believe steps should be taken in this direction

I am convinced that motion pictures can be used to considerable advantage in teaching Pharmacognosy as well as other subjects now being presented in pharmacy schools and I am not unmindful of the difficulties which may be involved in the production of films of outstanding character, however, in any program which we may propose we must understand that the purpose of motion pictures is not to afford entertainment or portray the unusual, but to present subjects which could not be presented with equal effectiveness by any other means

---

THE FIRST MODERN PHARMACOPŒIA *

BY EDWARD KREMERS

The word Pharmacopœia (1) did not appear until 1561 on the title page of one of the treatises now commonly designated by that name Moreover, some writers are inclined to recognize as a pharmacopœia any collection of pharmaceutical formulas, be they the *Luminare* of Nicolaus Præpositus (2), the *Formulary* of Scribonius Largus (3), or the directions carved into stone or brick of even more remote antiquity (4) However, most writers on pharmaceutical history prefer to regard as modern pharmacopœias those treatises, originally for the most part merely collections of formulas, that were compiled by special authority and made the pharmaceutical law of the city state which authorized and adopted them (5)

Viewed from this angle it is the Florentine *Receptario* which is generally recognized as the first (5) modern pharmacopœia As the title page indicates (6) it was compiled by the medical college at the request of the local apothecaries and published in 1498, the year in which Vasco de Gama circumnavigated the Cape of Good Hope, thus discovering the all water route to the (East) Indies This was six years after Columbus had started on his westward trip hoping to reach the same goal but ending in the discovery of the West Indies Both discoveries ultimately proved of the greatest importance to the materia medica, hence exerted an indirect influence on the making of pharmacopœias, though this influence did not manifest itself until much later (7)

* Section on Historical Pharmacy, A PH A , Madison meeting, 1933

As the first modern treatise of its kind, the Florentine book is of unusual interest to the student of the history of pharmacy Yet the information recorded in the so-called histories of pharmacy is most meager indeed

Scherer (8) (1822) records the titles of three impressions

Unfortunately, neither Phillippe (9) (1853) nor Phillippe-Ludwig (10) (1855) contain a subject index A casual examination of the table of contents and of the chapter on Italian pharmacy, however, failed to reveal a reference to the Florentine treatise

Frederking (11) (1874) in a chapter entitled "Aerzte und Naturforscher des 15 Jahrhunderts" makes the following remarkable statement "Ricettario aus Florenz, geb um 1450, schrieb ein med Werk in Italienischer Sprache, dessen lateinische Uebersetzung von Guanerius unter dem Tittel Antidotarium 1518 erschien"

Rice (12) (1895) refers to it as "the first formulary or pharmacopœia issued by some public authority"

Guareschi (13) (1897), the commentator on the national Italian Pharmacopœia, makes mention of an edition of1596

André-Pontier (14) (1900) makes no mention of the book

Schelenz (15) (1904) at least has something worth while to say, *viz*

"Die erste eigentliche Pharmakopoe, von einer Art Pharmakopoekommission bearbeitet und jedenfalls von gesetzlich bindender Kraft, wenn auch vorerst nur fuer den engen Kreis einer Stadt, ist das Ricettario di dottori del arte e di medicina del collegio Fiorentino all instantia delli Signori consoli della universita delli speciali Firenze 1498

' Diese Arbeit, die auf Andrängen der Florentiner Universita dei speziali, einer Art Apotheker-Gilde, von einer jedenfalls ad hoc von dem dortigen Arzte kolleg zusammenberufenen Kommission in Angriff genommen wurde, war grundlegend nicht nur fuer eine zweite Auflage von 1550, sondern auch fuer das Antidotar von Antwerpen von 1561 und das Kolner Dispensator von 1565, und sicherlich hat Cordus sie auch fuer seine erste deutsche Pharmakopöe von Nürnberg eingesehen und benutzt

"Ohne Zweifel ist die Bearbeitung des eben erwähnten Arzneibuches auf die Unannehmlichkeiten zurückzuführen, welche die Verschiedenheit der Arzneivorschriften in den mannigfaltigen von den Apothekern benutzten Kompendien, Antidotarien u dgl besonders in einer Stadt mit jedenfalls grossem Fremdenverkehr (wie in Florenz) nach sich ziehen musste"

The above quotation is taken from his chapter on "Mittelalterliche Arzneikunde" From the next chapter covering the 16th century, we quote the following paragraph

"1550 kam in Florenz das zweite, wieder vom Collegio de' medici bearbeitete Ricettario heraus, dessen Inhalt eingeordnet war in Semplici, Ricette, Misure und Succedanei Es gedenkt der Verfälschungen der ersteren Das Ricettario liegt der Antwerpener und Kölner Pharmakopoe zu Grunde" (16)

Tschirch (17) (1904) records the title of the first edition, also the dates of later impressions or editions, which we are not advised

In his chapter on "Pharmacopœias," Wootton (18), informs us that "The College of Medicine of Florence adopted an Antidotarium in the early part of that century (16th) and "

Danckwortt (19) (1913) makes the following statement

"Als erste Pharmakopœ in diesem Sinne ist ein Werk anzusehen, das im Jahre 1498 in Florenz erschien unter dem Titel Ricettario di dottori del arte e di medicina del collegio Fiorentino

all' instantia delli Signori consoli della universita dei speziali Die Florentiner universita dei speciali war eine Art Apothekerverein, auf dessen Wunsch das Arzneibuch von einer Aerztekommission herausgegeben wurde "

From Bruntz and Jalouv (20) (1918) the following statement may be quoted

' En 1498 le Collége des médecins de Florence public l'Antidotaire florentin, sous le titre *Ricetario di dottori dell'arte e di medicina del Collegio Fiorentino alla instantia delli Signori Consoli della universita speciali Firenze* Cet ouvrage est a juste raison, considére comme une des premières Pharmacopées officielles Il fut reédité d'abord en 1567 et souvent dans la suite 1571, 1574, 1597, 1623 1670, 1696 1789 "

LaWall (21) (1926) reproduces the title page of the 1696 edition which he enumerates in his Chapter "The Golden Seventeenth "

It is certainly worth while to quote these statements in full if for no other reason than to impress the student of our past with the painful meagerness of the information recorded Even the bibliographic data cataloged are extremely fragmentary and no attempt appears to have been made to discriminate between revisions and reprints Of a general pharmaceutical background, not to mention the equally important political, economic and social background, not a word, except possibly the most casual remark by Schelenz Certainly, the book that is pronounced the first official pharmacopœia, in other words, the first representative of that type of literature to which we like to refer as being the bible of the pharmacist, deserves more careful study and a more generous treatment

Having seen how little appears to have been known about this treatise to our pharmaceutical historians, let us now proceed to ascertain what may be learned about the book from other sources

First of all, let us try to find an answer to the question why Florence should have been the first city state to produce such a guide for its apothecaries

Strange as it may seem it was neither Venice nor Genoa the two principal seaports which played so important a role in the commerce of oriental drugs and spices that was the first to have a pharmacopœial standard officially adopted and in force Neither did Naples nor Messina, the two other seaports of importance attain to this distinction It was Florence, the inland commercial metropolis of the north central part of the Appennine peninsula that took the first step in this direction Moreover, a study of the pharmacopœial map of Italy reveals that it was in the Lombardy plain and surrounding territory that city-state pharmacopœias flourished, presumably for the simple reason that here agriculture, industry and commerce enjoyed a greater development than in the more mountainous portions of the peninsula The seaports enjoyed the possible advantage of the Levant commerce, but they presumably did not have the hinterland to develop either agriculture or industry Moreover Florence, while not in the Lombardy plain itself, was on the main highways across the Alps Pilgrims to Rome, crusaders going and returning, armies of the German emperors passed through this flourishing city It may have been, in part at least this international aspect of Florence, which as Schelenz points out (22) contributed to the desirability of a standard to be adopted by all apothecaries

As already stated a mere glance at the map of the city-state pharmacopœias of Italy reveals that the principal pharmacopœial development took place in the flourishing Lombardy plain A somewhat more careful scrutiny of this same map reveals the mighty Po and its northern tributaries also the Etch (Adige), the Brenta and the Piave with their sources in the Alps The valleys of these rivers naturally constituted as many routes Lakes Como and Garda afforded additional waterways farther to the north Beyond the water shed, the Rhone, the Rhine and the Danube have their origin and their valleys and those of their tributaries constituted as many routes into the transalpine countries Mention need only be made of the St Gotthard pass, the Engadin

and the Brenner pass to indicate the commercial, not to say anything about the military, importance of the topography to the north of Florence and to acquire a glimpse of the strategic significance of this city of the Medici

Having pointed out how the geographical position of Florence aided its economic development that caused the humanities and the arts to flourish, a brief review of its history cannot be out of place

'It would seem that as early as the time of Sulla there was a Roman colony on the site now occupied by Florence, another was established after the death of Julius Caesar, and it soon became a thriving town But it was not till the time of Charlemagne that Florence began to rise out of obscurity In the 11th century Florence and a great part of Tuscany were bequeathed to Pope Gregory VII by the Countess Matilda Under the protection of Rome, Florence speedily adopted the forms and institutions of a free city As early as the 11th century the Florentines were European traders and the possessors of commercial depots in the seaports and cities of France and England, and their skill as workers in gold and jewels had grown famous The 'arti' or trade gilds were of great importance During the bitter wars between pope and emperor which raged throughout Italy, Florence and all Tuscany seemed to have been saved from the feuds of Guelphs and Ghibellines—the former adherents of the papacy the latter of the empire But in 1215 Florence became involved in the great party struggle"

This struggle, supported by the French, lasted for two centuries and more At one time during this period the plague or black death, demanded 100,000 victims, viz in 1348 In 1406 Pisa, an ancient and illustrious republic, fell under the sway of Florence, becoming, as it were its seaport near the mouth of the Arno, in the beautiful valley of which Florence itself is located From 1434 the history of Florence is intimately bound up with that of the House of the Medici After various ups and downs Pope Clement VII of the House of Medici, formed a league with the Emperor Charles V which resulted in the capture of Florence in 1530 From this period on Florence loses her distinctive history, and is only known as the capital of the grand duchy of Tuscany (23)

As already pointed out, this meager skeleton of a general background, receives no pharmaceutical flesh and blood from the histories of our calling When, therefore, Luca Landucci's diary, covering the period of 1450 to 1516, was translated into English (24), it was hoped that this record of a Florentine apothecary might throw light on the history of the first modern pharmacopœia But while the author records faithfully the doings of the piazza on which his shop was located, not a word about the official guide True, he makes mention of the revival of the apothecaries' guild, but only to inform us that its members met to discuss the price regulation of candles, but not that the guild requested the medical faculty to compile a pharmacopœia for their guidance (25)

Once more, therefore, we are thrown upon the pharmacopœia itself for such internal evidence of its inception and evolution as we may glean from the title pages of its several editions or from the introductory prefaces

P S After this paper had been written, there came to the writer's attention a lengthy article on early Italian pharmacopœias published in an Italian medical journal as far back as 1887 Both language and place of publication may be responsible for the fact that none of the authors mentioned were aware of such an article Although this discovery will give new direction to further work on the subject, the facts recorded in this account remain unchanged

REFERENCES

(1) The *Pharmacopoea Mediomatrica* (Metz) of Anutius Foesius Schelenz, *Gesch d Pharm*, page 416

(2) *Ibid*, page 407

(3) *Ibid*, page 165

(4) *Ibid*, page 23

(5) *Ibid* page 338

(6) See Bibliography of the *Ricettario*

(7) In this connection it would be of interest to ascertain which was the first American drug to find official recognition in a European pharmacopœia (See German translation of Monardes)

(8) A N Scherer, *Literatura Pharmacopœarum* (1822), 5

(9) Adrien Phillippe, *Histoire des Apothicaires* (1853)

(10) A Phillippe u H Ludwig, *Geschichte der Apotheker* (1855)

(11) Carl Frederking, *Grundzuege der Geschichte der Pharmacie* (1874), 142

(12) Charles Rice *The Study of Pharmacy* III *History of Pharmacopœias* Reprint from the *Ph Era* (1895), 9

(13) I Guareschi *Commentario della Farmacopea Italiana* (1897)

(14) L André Pontier, *Histoire de la Pharmacie* (1900)

(15) Hermann Schelenz *Geschichte der Pharmazie* (1904), 338

(16) *Ibid* page 416

(17) Alexander Tschirch, *Die Pharmakopœe, ein Spiegel ihrer Zeit* (1904), 4

(18) A C Wootton, *Chronicles of Pharmacy*, II (1910), 59

(19) P W Danckwortt, *Die Entwicklung der Arzneibuecher* (1913), 3

(20) L Bruntz et M Jaloux, *Plantes officinales* etc (1918) 50

(21) Chas H LaWall, *Four Thousand Years of Pharmacy* (1926), 274 and opposite 364

(22) Schelenz *Gesch d Pharm*, page 339

(23) Based on Funk and Wagnall's *Standard Encyclopedia*

(24) *A Florentine Diary from 1450 to 1516* by Luca Landucci Translated from the Italian by Alice De Rosen Jervis Published in London in 1927 by J M Dent & Sons, Ltd, and in New York by E P Dutton & Company

(25) For an account of the author and his diary so far as pharmaceutical matters are concerned see the paper read at the Portland meeting of the A PH A in 1929

A STUDY OF THE HYDROGEN-ION CONCENTRATION OF TINCTURE OF DIGITALIS, TINCTURE OF ACONITE AND FLUIDEXTRACT OF ERGOT *

BY C JELLEFF CARR AND JOHN C KRANTZ, JR

DEPARTMENT OF PHARMACOLOGY, SCHOOL OF MEDICINE, UNIVERSITY OF MARYLAND

Introduction—This investigation was undertaken for the Revision Committee of the U S P A monograph on hydrogen-ion concentration has been tentatively accepted for admission to the U S P XI Thus, the hydrogen-ion concentration of official preparations will be stated where it is deemed desirable The determination of this constant must, however, yield information pertinent to the therapeutic efficacy or stability of the product The test outlined must be simple and yet reasonably accurate The colorimetric method meets these fundamental requirements and is accepted

The preparations that have been studied are Tincture of Digitalis, Tincture

* Section on Practical Pharmacy and Dispensing Madison meeting 1933

of Aconite and Fluidextract of Ergot The literature concerning the hydrogen-ion concentration of these preparations has been reviewed Representative samples of the preparations as purchased and as experimentally prepared have been studied As a result of these reviews and studies certain conclusions have been drawn and recommendations made

EXPERIMENTAL

Tincture of Digitalis—The physicochemical work on the hydrogen ion concentration of extractive preparations of digitalis began about a decade ago Takahashi (1) showed that the addition of 0 05 per cent to 0 1 per cent of hydrochloric acid to the infusion of digitalis increased the stability as shown by the frog method Tainter (2) showed the physiological activity of freshly prepared infusions of digitalis is independent of the hydrogen ion concentration He showed that the infusion may develop acid or alkaline reaction upon standing, depending upon the nature of the decomposition The hydrogen ion concentration of the tincture was found by Tainter to be the equivalent of $N/10{,}000$ hydrochloric acid, approximately p_H 4 6 Smith (3) in his studies on the determination of the hydrogen-ion concentration in alcoholic solutions investigated tincture of digitalis and found the range of p_H to be between 5 12 and 5 77 Of special interest is the work of Joachimaglu and Bose (4) who showed the stability of tincture of digitalis to be increased by the addition of 0 1 or 0 2 per cent of tartaric acid These investigators found the p_H of tincture of digitalis to be 5 88, with 0 1 per cent tartaric acid the p_H was 5 44 and with 0 2 per cent 5 13 The stability of the heart tonic value of the tincture was not markedly different when tartaric acid was added In 1921, Joachimaglu (5) had observed that the addition of sodium bicarbonate to tincture of digitalis materially increased the speed of deterioration

In 1930 Krantz (6) studied the buffer capacity of tincture of digitalis In this study the p_H of seven samples of digitalis are reported

No	p_H
1	5 88
2	5 67
3	5 70
4	5 67
5	5 68
6	5 73
7	5 61

The change in p_H upon aging of the tincture, when stored in indirect light is reported

p_H When Prepared	p_H After One Year	p_H After Two Years
5 88	5 66	5 38

In the same year, Krantz and Carr (7) studied the change of p_H of tincture of digitalis when stored in various colored glass in direct light

	p_H			
When Prepared	Flint Glass	Blue Glass	Amber Glass	Irradiated
	5 59	5 59	5 59	5 59
42 days	5 09	5 18	5 20	5 19
70 days	4 89	4 87	4 98	

In 1931 Krantz (8) studied the hydrogen ion concentration of infusion of digitalis and reported the following p_H measurements

No	p_H Infusion	p_H Tincture
1	5 81	5 90
2	5 96	6 20
3	4 97	6 02
4	5 86	5 90

In 1931 Haag and Jarrett (9) found no constant relationship between the hydrogen-ion concentration and the heart tonic value of the tincture The tinctures studied had a hydrogen ion concentration generally below p_H 4 50

Krantz and Munch (10, 11) in 1932 studied the influence of the alcoholic content of the menstruum upon the p_H of the tincture They report an average p_H of four tinctures U S P 5 75 The tinctures from the same drugs made with dehydrated alcohol showed an average p_H of 4 00 This vast increase in acidity is accompanied by a drop in heart tonic value However, the authors indicate that the diminution in potency is in all probability caused by the inefficiency of dehydrated alcohol in the extraction of the glucosides

Scoville (12) in his recent studies has buffered the tincture with sodium acetate and reports increased stability

Studies conducted by Munch (13), as chairman of the committee on bioassays of the AMERICAN PHARMACEUTICAL ASSOCIATION, seem to indicate that the rate of deterioration of the tincture is slow Therapeutically, the stability scarcely changes in two years

CONCLUSIONS

From these data the following conclusions are drawn

1 Tincture of digitalis made by the official process will have a p_H between 5 50 and 6 00

2 This tincture (considering the manner of its dosage) is a stable product

3 There is no unequivocal evidence to show that by buffering or adding acid to the product its stability can be increased

4 It has been suggested, therefore, that no p_H range for tincture of digitalis be stated in the forthcoming Pharmacopœia

Tincture of Aconite—In 1924 Swanson (14) published some studies on the stability of the tincture and fluidextract of aconite In this work the literature is quoted, indicating the stability of the alkaloid in acid solution Swanson concluded that, ' The rapid deterioration of tincture of aconite can be prevented by the addition of an acid to the finished percolate or menstruum " Further ' That the deterioration of the tinctures and fluidextracts is probably due to the decomposition or hydrolysis of the alkaloids, and may be a hydrogen ion concentration factor "

In a previous communication Swanson (15) had recommended adding 2 per cent acetic acid or 0 1 per cent hydrochloric acid to the menstruum as a stabilizer for tincture of aconite

In a subsequent communication Swanson and Hargreaves (16) showed a definite relationship between the stability and p_H of tincture and fluidextract of aconite Without acid the p_H of tincture of aconite is 5 13 The stable p_H range lies between 2 5 and 3 0 The authors state, ' The amount of acid required to produce the desired p_H depends upon the amount of alkaloids and inert material present in each lot of drug " About 0 03 cc HCl per 100 cc produces approximately this p_H This is approximately 2 9 cc of diluted hydrochloric acid per liter

EXPERIMENTAL

A sample of tincture of aconite was prepared by the official process The drug was a composite sample of three commercial specimens of aconite The p_H of the tincture was determined by the Wilson (17) type hydrogen electrode The tincture was diluted fivefold with a mixture of 3 parts of alcohol and one part of water At this concentration the tincture retains only a pale yellow color

p_H Tincture	p_H Dilution
5 56	5 90

Twenty-five cc portions of the tincture were treated with varying quantities of diluted hydrochloric acid The p_H of these was determined and also the p_H of the fivefold dilution by means of the hydrogen electrode These results are shown in the following table

No	Cc Dil HCl	p_H Tincture	p_H Dilution
0	0	5 56	5 90
1	0 15	3 65	3 85
2	0 30	2 32	2 61
3	0 45	1 95	2 42
4	0 60	1 72	2 22
5	0 75	1 58	2 06
6	0 90	1 46	1 96
7	1 05	1 38	1 85
8	1 20	1 32	1 71

These results are plotted in Fig 1, expressing the acid in moles

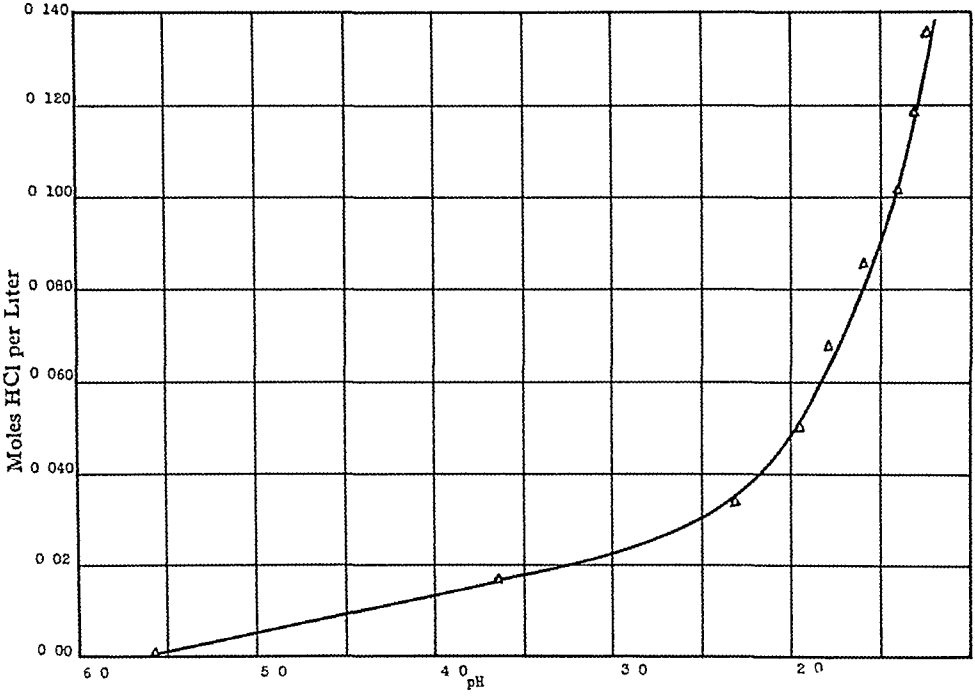


Fig 1 —Influence of strongly dissociated acid on tincture of aconite

The curve is a straight line between p_H 5 56 and 3 00 To change the p_H of this composite tincture 2 56 p_H units, 0 022 mole of HCl per liter was added to the buffer capacity of the tincture using the Van Slyke (18) ratio $\frac{-dB}{-dp_H} = \frac{-0\ 022}{-2\ 56} = 0\ 0086$ It is indeed of interest to note that the value obtained by Krantz (19) for tincture of digitalis was 0 0090

For practical purposes, the indicator solutions thymol blue and methyl orange were selected The p_H range of the former is 1 2 (red) to 2 6 (yellow), at p_H 2 2 an orange color is exhibited With methyl orange the range is p_H 3 1 to 4 4 Thus, a solution acid to methyl orange (p_H 3 1) and showing an orange color with thymol blue will be between p_H 2 2 and 3 1, *i e*, the stable range suggested by Swanson

The preparations in the foregoing table reacted to these indicators as follows

No	Thymol Blue	Methyl Orange.
0	Yellow	Yellow
1	Yellow	Yellow
2	Orange	Red

No	Thymol Blue.	Methyl Orange
3	Red	Red
4	Red	Red
5	Red	Red
6	Red	Red
7	Red	Red
8	Red	Red

Thus, sample No 2 meets the requirements and the p_H of this tincture is 2 32 electrometrically

Accordingly the following statement is suggested for the Pharmacopœia under the tincture of aconite monograph

Add to the finished percolate diluted hydrochloric acid in 0 5 cc volumes until 1 cc of the tincture diluted to 5 cc with a mixture of 3 volumes of alcohol and one volume of distilled water shows a red color when 6 drops of methyl orange T S are added, but no deeper than an orange color, when 5 drops of thymol blue T S are added to another similar dilution of the tincture (p_H 2 0 to 3 0) '

Swanson's stability curve for the tincture shows a long, flattened portion of maximum stability which is well included within this p_H range

As a matter of general interest, five commercial samples were purchased and the p_H determined as described previously These values are shown in the following table

A	p_H 3 48
B	p_H 3 05
C	p_H 4 03
D	p_H 2 75

Only sample "D" met the requirements of the test suggested, although each label stated that the hydrochloric acid had been added

CONCLUSIONS

1 A method has been described for determining the p_H of tincture of aconite which provides for variations in commercial samples of crude drug

2 A colorimetric method of controlling the p_H of the tincture has been described

3 The buffer capacity of the tincture has been determined

4 The Van Slyke ratio was observed to closely approach the ratio for tincture of digitalis

5 Samples of commercial tinctures showed a wide deviation from the suggested optimum p_H, which suggests the need for standardization

Fluidextract of Ergot —There seems to be no controversy regarding the favorable influence of acids upon the stability of fluidextract of ergot The acetic acid employed in the menstruum of the U S P VIII was changed to the more strongly ionized hydrochloric acid in the U S P IX and this formula was in turn adopted by the revision committee of the 1920–1930 decade During the last half decade, the interest in fluidextract of ergot, which had reached a condition of somnolent passivity, was revived and deepened by a variety of activities The ergot investigation of 1929 instituted by a senatorial committee the appearance of ergotamine tartrate on the market the indictment and restoration to grace of the cock's comb assay and the influence of hydrogen ion concentration upon the stability of extractive preparations of ergot have served to bring this drug an unusual degree of legal and pharmaceutical prominence The results of the studies of

hydrogen-ion concentration on the stability of the fluidextract are, however, the chief concern of this report

In 1929 Swanson (20) studied the standardization and stabilization of ergot preparations in relationship to the hydrogen-ion concentration factor In this work he showed that the fluidextract of ergot requires a certain amount of acid to prevent deterioration The graph set forth in Swanson's report shows that in the study of the fluidextract over a period of two years a p_H of 3 00 or less is necessary to prevent deterioration The importance of this, gleaned from the work of this investigator, cannot be overestimated for at p_H 5 35, the fluidextract lost 90 per cent of its activity over a period of two years, whereas, those fluidextracts having a p_H less than 3 00 retained more than 90 per cent of their original activity over this same period

In 1930 Thompson (21), in a comprehensive study of ergot and its extractive preparations, makes the following comment regarding the addition of acid

"The hydrochloric acid of the prescribed menstruum plays a double rôle *First*, it increases the efficiency of the menstruum in extracting the specific alkaloids, and *second*, it increases the stability of the product Proper control of this acidity is therefore of vital importance The use of organic acids, such as citric or tartaric, in place of hydrochloric serves no good purpose, in that such departure from the U S P method decreases the efficiency of the menstruum in extracting the alkaloids and also detracts from the stability of the finished product "

In a subsequent communication Thompson (22) studied the stability of various samples of fluidextract of ergot in relation to the hydrogen-ion concentration of the preparation Thompson lists the following data

No	Present Age Approx	Per Cent Deterioration in 18 Months	p_H
1	5 years	10 6	4 192
2	3 years	5 7	1 778
3	18 months	8 4	1 809

In this work Thompson calls attention to the fact that the fluidextract with the highest p_H showed the greatest degree of deterioration

Rowe and Scoville (23), in 1931 made a study of the stability of fluidextract of ergot using, respectively, hydrochloric acid and hypophosphorous acid as stabilizing agents Most of the preparations studied by these workers deteriorated rather rapidly and because in most instances the p_H was practically the same, no conclusions can be drawn from this work regarding the influence of p_H on the stability of the fluidextract

In 1932 Swanson (24) studied the stability of ergotamine tartrate crystals in hydroalcoholic solution in the presence of phosphate buffers These workers conclude that a solution of pure ergotamine tartrate crystals in 40 per cent alcohol with a hydrogen-ion concentration of around p_H 3 00 appears to be the critical point, where there is the least deterioration

Wokes and Elphick (25) observed that the efficiency of extraction of ergot with a 50 per cent neutral alcohol depended upon the acidity of the crude drug With more acid specimens of ergot (p_H below 5 5) the neutral menstruum was quite as effective as one to which either hydrochloric acid or tartaric acid had been added These workers suggest that owing to the presence of certain phosphate buffers in the drug, the amount of acid required for each sample of ergot cannot be definitely established Therefore, a control of the finished product by p_H adjustment seems to be advisable

Swanson (26) reported in 1932 that over a period of three years, there was a distinct deterioration in eight samples of fluidextract of ergot studied However, the samples with a p_H around 3 00 showed the least deterioration In the conclusion of this paper, Swanson, *et al* set forth the following comment "The data in this report show no definite conclusions that the deterioration of fluidextracts of ergot or a solution of pure ergotamine tartrate is prevented by definite hydrogen ion concentration "

In a subsequent investigation from Swanson's laboratory, Powell (27) reported on a series of eighteen fluidextracts These products were stored six months, at room temperature, and subsequently assayed by the Broom and Clark method and also by Smith's chemical method The results of the two methods of assay show a remarkable agreement Again, this worker observed that those fluidextracts, the p_H of which was close to 3, retained the greatest degree of original

potency At the close of the account of this investigation Powell made the following statements 'Some fluidextracts of ergot deteriorate rapidly regardless of hydrogen-ion concentration," and also ' The hydrogen ion concentration still appears to have some influence on the stability of fluidextracts of ergot '

Smith and Stohlman (28) conclude from a series of extensive investigations that a variation of p_H from 5 2 to 2 2 does not favor the stability of fluidextract of ergot

Swoap, *et al* (29) reviewed the work of previous investigators in the field and in conjunction with studies which they conducted concluded that the manipulation of the p_H of the fluidextract did not favorably influence the stability of the product Contrary, in a measure at least to the findings of Swanson and his associates, Swoap states that 'p_H variations between the limits of 3 0 and 6 1 do not enhance the stability of fluidextract of ergot," furthermore, manipulation of p_H in the finished fluidextract appears to be more harmful than beneficial "

CONCLUSIONS

In summarizing the foregoing opinions of the authorities in the field of the pharmacy and pharmacology of ergot, one is convinced that there exists absolutely no unanimity of opinion regarding the effects of the manipulation of the p_H The fluidextracts prepared by the official process containing 20 cc of hydrochloric acid per liter show a p_H of approximately 4 5 Apparently this value is subject to a considerable degree of variation However, as the evidence which is available to show that changing this value to p_H 3 is in no sense convincing, it seems contrary to the policy of the Pharmacopœia to establish such a requirement

Unless, therefore, prior to the publication of the forthcoming revision of the Pharmacopœia, there is unequivocal evidence produced to show that the manipulation of the p_H is an important factor in controlling the stability, the authors recommend that the acidity of the menstruum and percolate remain unchanged

REFERENCES

(1) J Takahashi, *Tohoku J Exptl Med*, 19 (1927) 491
(2) M J Tainter, Jour A Ph A, 15 (1926) 255 (3) R B Smith *Ibid*, 17 (1928) 241
(4) J Joachimaglu and P Bose, *Arch exptl Path Pharmakol* 102 (1924) 17
(5) J Joachimaglu, *Ibid* 91 (1921), 156
(6) J C Krantz, Jour A Ph A, 19 (1930), 366
(7) J C Krantz, Jr, and C J Carr, *Ibid* 19 (1930), 32
(8) J C Krantz Jr, *Arch Pharm*, 7 (1931) 470
(9) H B Haag and L E Jarrett, Jour A Ph A, 20 (1931) 474
(10) J C Krantz, Jr, and J C Munch, *Ibid*, 31 (1932), 16
(11) J C Krantz, Jr and J C Munch, *Ibid*, 32 (1933), in Press
(12) L W Rowe and W L Scoville, *Ibid* 21 (1932) 160
(13) J C Munch Personal Communication
(14) E E Swanson, Jour A Ph A, 13 (1924), 1108
(15) E E Swanson and A L Walters, *Ibid* 12 (1923) 957
(16) E E Swanson and Chester C Hargreaves, *Ibid* 16 (1927), 296
(17) J A Wilson, *Ind Eng Chem* 17 (1925), 74
(18) D D Van Slyke, *J Biol Chem* 53 (1922), 528
(19) J C Krantz, Jr, Jour A Ph A, 19 (1930), 366
(20) E E Swanson, *Ibid*, 18 (1929), 1127 (21) M J Thompson *Ibid*, 19 (1930) 713
(22) M J Thompson *Ibid*, 20 (1931), 1027
(23) L W Rowe and W L Scoville, *Ibid*, 20 (1931), 1030
(24) E E Swanson *et al* *Ibid*, 21 (1932), 320
(25) F Wokes and G K Elphick, *Quart J Pharm Pharmacol*, 2 (1929) 539 and 3 (1930), 59 (26) E E Swanson, *et al*, Jour A Ph A, 21 (1932), 235
(27) C E Powell, *et al* *Ibid* 21 (1932), 1003
(28) M I Smith and E H Stohlman, *J Pharmacol* 43 (1931) 621
(29) O F Swoap *et al* Jour A Ph A 22 (1933), 8

JOINT SESSION OF THE SECTION ON EDUCATION AND LEGISLATION, A PH A, CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS AND CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

ABSTRACT OF THE MINUTES HELD IN MADISON, WIS, AUGUST 31, 1933

The meeting of the Section on Education and Legislation, Conference of Pharmaceutical Law Enforcement Officials, and Conference of Pharmaceutical Association Secretaries, convened August 31st, at 8 00 P M The meeting was called to order by Chairman R L Rivard, who suggested that reports on enacted and proposed legislation affecting pharmacy in various states be taken up This idea was carried out

Alabama—W E Bingham stated that at the Toronto meeting he had made a report on legislative happenings and there had been no regular meeting of the Alabama Legislature since that time He said further that three years ago the Department of Agriculture had charge of the state inspectors and paid all expenses and salaries, but when the depression came on these expenses were thrown back on the Board of Pharmacy Two special sessions of the Legislature were held, the first, to create an income tax and place a special sales tax on drug stores, the sales tax was defeated but the income tax was passed The latter was submitted to the people and it was killed by them Another special session considered an income tax and a joint sales tax which applied to everybody Through combined efforts of the druggists and others the bill was defeated, later, an income tax was passed

Colorado—Charles J Clayton reported for Colorado, in part as follows There was no legislation during the regular session of the Colorado Legislature and everything espoused by the drug trade organizations was successful, no sales tax was imposed A 'Junior Capper-Kelly" bill became a law, this was introduced by the Retail Merchants Association of Colorado, the membership of which is chiefly made up of grocers, success of the 'Anti-Discrimination" bill was due to the same activities Colorado druggists espoused and secured the passage of a bill forbidding the use of "Drug Store' or 'Pharmacy" signs at or on places which are not licensed pharmacies by the Board of Pharmacy A bill was passed under which others than pharmacists may sell certain specified drugs in original packages, in places located more than five miles from a licensed pharmacy—a license fee of five dollars per year is imposed for this privilege A new alcohol law was passed, which liberalizes the conditions under which alcohol may be sold at wholesale, but forbids its sale at retail, except as a component part of some manufactured article which is unfit for beverage use

The sale of beer in bottles, not to be consumed on the premises was authorized at the regular session and at a special session held in August, this was amended to permit the sale of beer on draught, in any place that is willing to pay the license fee

Georgia—Robert C Wilson reported for Georgia as follows

A prerequisite law was passed which will require graduation from a generally recognized School of Pharmacy plus one year of drug store experience

In the reorganization of the State Board of Health two pharmacists and two dentists along with physicians now compose the Georgia State Board of Health

The "Uniform Narcotic Law" passed the Senate but was not acted upon in the House, largely due to the fact that physician members of the House blocked it until too late in the session to have it put on the calendar

A bill was introduced prohibiting the sale of barbituric acid compounds or derivatives and other hypnotics except on physicians prescriptions, but this failed of passage

An additional ten per cent tax on cigars and cigarettes to an original ten per cent was defeated

A tax of twenty-five cents per gallon on soda water syrup was defeated

Maryland—Robert L Swain reporting for Maryland said that the Legislature had a very hectic session A matter of early prominence was the financial status A general sales tax was proposed which later was dropped and a commodity tax was discussed, finally, there was no sales tax passed and there was also a substantial decrease in state taxes He referred to conditions in Maryland in saying that its bonds were sold at the highest price of any state bonds in recent

years A chain store tax, modeled on that of Indiana, was passed, a maximum of $150 is imposed when a chain reaches a total number of twenty stores There was considerable opposition but, finally, it was passed almost unanimously in the House, only five votes against it, and the Senate passed the bill unanimously

The Uniform Narcotic bill was presented The speaker gave an historical account of this model He referred to a meeting with the Committee in charge of the measure at which time it was pointed out that the proposed measure was unsatisfactory However, it was approved by the American Bar Association and the bill submitted in due course in about forty states As soon as it was introduced in Maryland a conference was arranged, at which time it was emphasized that certain specific amendments were necessary before the bill would be acceptable to the drug group It became evident that an effort was being made on the part of the Federal Commissioner of Narcotics to have the bill passed in Maryland as a proving ground At the hearing on the bill the Federal Commissioner of Narcotics and his legal staff were present, the Maryland organizations voiced their objections, the members of the Medical Society voiced their protest and also the American Dental Society and the State Board of Health of Maryland The hearing evidenced that the bill was hopelessly defective and the net results would be a great burden on druggists and others who were charged with prescribing and dispensing of narcotics The bill was finally defeated, only nine states out of the forty in which it was introduced passed the measure The speaker stated that the Federal Narcotic Commissioner is still working on the bill with the hope of making it more acceptable

It was provided by the Maryland Legislature that druggists cannot sell beer in any form A separate bill was enacted for the city of Baltimore and another for the other part of the state The Solicitor for the city of Baltimore had requested an interview with Dr Swain, who informed the solicitor it would be a mistake to have drug stores handle beer, the latter was pleased with the stand taken by Dr Swain During the course of discussion in the Legislature the members of the drug group voiced their opposition to the sale of beer in drug stores, and the Governor accepted of provisions recommended by them

During the year the Attorney General ruled that automatic vending machines could not be used for vending drugs A copy of this opinion was sent to the secretary of the Conference of the Law Enforcement Officials and to the secretaries of the various State associations Quite a number of states passed similar laws, prohibiting the vending of drugs by means of automatic vending machines

Massachusetts—Carl G A Harring stated that a Massachusetts bill prevented stores other than registered drug stores from displaying signs which indicated that they were registered drug stores, if they were not It was defeated in the Senate A bill was introduced which provided that insulin was to be given to every one who wanted it, this bill was defeated by the Board of Health Another bill proposed a beverage tax by which it would have become necessary to keep account of all sales and tax paid The bill was defeated The Uniform Narcotic" bill was introduced, it was defeated

Michigan—M N Henry reported for Michigan He stated that much legislation was proposed by druggists but little enacted A bill was introduced prohibiting the sale of drugs in other than drug stores, after considerable discussion the bill was defeated It is contemplated to bring the bill back into the Legislature this year A bill was proposed to cut out the *per diem* of members of the various Boards in Michigan A Paregoric" bill was introduced and this also was killed

A chain store tax for a chain of over three stores was passed, but vetoed by the Governor and passed over his veto A sales tax was passed and this is a great nuisance The average druggist is only able to collect about one half the tax Another bill was the Trades Practice Bill which provided that a chain must have uniform prices all over the state for each article, this was defeated

Pennsylvania—C Leonard O'Connell stated that they had some trouble with the Revenue Department in having prescriptions exempted from the Mercantile Tax This required that the Mercantile Tax Law had to be amended and while there was some difficulty it finally was amended and signed by the Governor

M N Henry, speaking for Michigan, stated that a bill was passed which provides that Assistant Registered Pharmacists' after five years may become full ' Registered Pharmacists "

Robert L Swain referred to the Pennsylvania matter spoken of by C Leonard O'Connell He said that this was probably due to the terminology It is much better to speak of prescription practice than prescription business

Indiana —F V McCullough stated that a tax of one fourth of one per cent had been placed on gross receipts

West Virginia —J Lester Hayman stated that the druggists had been very successful and had received, practically everything asked for The Governor called a special session of the Legislature for raising revenue After a 5 weeks' fight the session ended without revenue enactment A bill was prepared prohibiting sales of drugs by vending machines, which was passed A compromise on a sales tax resulted in a tax of three-fourths of one per cent A bill providing for registered drug stores was passed after considerable effort A chain store tax, maximum of $250 for each store over seventy five and $2 for an individual was passed A bill providing for a 50 cent tax on whiskey and an annual tax of $10 for the sale of medicinal wines was passed

Texas —Walter D Adams stated that there was not much to report from Texas There was a slight change in the State Narcotic Law sponsored by the State Medical Association

There was trouble, because the Attorney General declared that part of the law by which the State Pharmacy Board collected the state registration money and turned it over to the State Association was unconstitutional Attorneys were employed and, finally, they were convinced that if it was not turned over to the State Association it should be returned to the individuals The Attorney General, later, ruled that the law was constitutional About $9000 was involved, a test case was made and the druggists won out

Indiana —F V McCullough stated that the Indiana Legislature continued in session for about 100 days during the past year The ' Uniform Narcotic Bill" was introduced, but it was finally killed in the Senate It was reintroduced and the bill was turned over to an attorney of the Medical Association and Mr McCullough was asked to assist in rewriting the bill The objectionable features were cut out and the bill passed in that way A poison bill brought about considerable publicity on account of a poison case in Indiana at that time The bill passed the House but was killed in the Senate

A bill permitting the sale of beer in drug stores is in effect and in some stores it is being sold, in his opinion, it would have a demoralizing effect on the drug business An attempt will be made at the next session of the Legislature to prohibit the sale of beer in drug stores A license tax has been imposed for the sale of whisky and a tax of 25¢ a pint A chain store tax bill was passed requiring a payment of $3 for individuals and $5 for chains

South Dakota —Rowland Jones reported that the grocers endeavored to have more privileges in selling drugs and had a bill introduced permitting the sale of patent and proprietary medicines as well as household remedies After considerable discussion, household remedies were eliminated and the license fee was rasied to $3 for the sale of patent and proprietary medicines Wholesale houses encouraged a number of venders selling patent medicines, but as the grocers could not sell these most of the goods were returned A gross income tax was passed and one-half of one per cent for manufacturers and one quarter of one per cent for wholesalers This has raised a large amount of money and created quite a good deal of criticism The cigarette and cosmetic taxes were defeated

New Jersey —R P Fischelis stated that following some rather sad experiences in obtaining legislation, it was found preferable not to amend an existing statute as it gives the legislators a chance to amend in a way that is undesirable If the amendment does not go through as wanted the existing law is lost

In New Jersey they had found it wiser to supplement with a new act The first law passed by the present Legislature provides that prescriptions are to be compounded only by registered pharmacists, that a prescription bear the name and address of the customer and be kept on file In order to substitute ingredients of a prescription the consent of the patron must be given

Another supplement is the 'Barbituric Law " Products included in this law may not be sold at retail except on prescription and under the direct supervision of registered pharmacists

The Pharmacy Board now has to rule on several points of this law and information is being obtained from manufacturers A question has come up as to whether prescriptions of that type can be renewed unless advised by the physician The matter is now before the Attorney General for ruling Legislation has been responsible for bringing together the various professions

and among these the inspectors' consolidation bill which brings all the boards under one unit It has been presented several times during the past ten or fifteen years and came very nearly to adoption about three years ago The Governor asked the president of Princeton University to conduct a survey on the consolidation of state institutions with a view to economize This was hurriedly done and a great many statistics were used that did not apply at the present time One of the recommendations made was that the professional boards be consolidated and a conference was had on the proposal Formerly the expenses were paid out of the money taken in by the Board but now it has been suggested that the money raised be turned into the fund and an appropriation made to the Board of Pharmacy A former Attorney General was employed and finally it was agreed that the items be included in the budget, but that the Board be allowed to spend the money as collected and this has worked out very well Support has been given by the professional groups

Relative to the Uniform Narcotic Bill ' the editor of the *New York American* conferred with a group of professional people and told them he was going to have the bill introduced by the president of the Senate Secretary Fischelis called a meeting of drug groups and some changes were proposed, but before these could be printed the bill had been passed He commented, that this shows the power that is wielded by a large Metropolitan newspaper

The beer legislation was so worded that local communities could arrange the sale and, as far as he knew none of the drug stores were selling beer An opinion was given by the Attorney General prohibiting the sale of drugs by automatic vending machines

The Legislature is still in session (at this time) A bill was introduced providing that insecticides could only be sold by registered pharmacists

In speaking of the Pharmacy Board as the sole regulatory body for pharmacy, Dr Fischelis said that it seemed to him that if these various laws are to mean anything at all, they cannot be left in the hands of county or state officials They must come under the state boards as these boards are the only bodies qualified to enforce the law If it is under the State Board of Health a pharmacist should be on the Board, otherwise the Pharmacy Board should have supervision He thought it was very important for protecting the health of the public Local officers and district attorneys could not be depended upon to enforce these laws In New Jersey there is a working arrangement with the Board of Health and in cases of adulteration the Board prosecutes on the ground of protecting public health

Under the Narcotic Law, the matter of enforcement was left blank as the Board did not desire this work it being a duty for detectives and not for pharmacists The Board also did not have the necessary money and considerable money is required for enforcement Enforcement of laws should be in the hands of those who are qualified

J W Slocum asked why the State Board of Pharmacy bothered with the narcotic act In Iowa it was left to the Federal government

Secretary Fischelis said that they had a different proposition to contend with than those of an inland state There was considerable forging of prescriptions and the reason for the state narcotic law was to give help to the Federal government

F V McCullough stated that the Indiana Board of Pharmacy asked him to advise druggists who violated the narcotic law and warn them The Federal narcotic inspectors informed him that there had been a number of violations and forging of prescriptions They had the names of a number of violators who had ordered large amounts of paregoric shipped into the state

W H Rivard stated that in Rhode Island the narcotic law is enforced by Federal officials and that there is little traffic in narcotics and practically no forging of prescriptions

Connecticut—A legislative attempt to restrict the opening of drug stores was read by Miss Garvin in the absence of Mr Beirne, the author A very brief abstract of this report is given in the following

It was stated that pharmacists of Connecticut endeavor to pass laws which will serve the future—laws that will benefit the public and majority of druggists Opposed to class legislation the druggists of Connecticut consider the interest of the many instead of the few and these thoughts guided them in their legislative efforts during the year A law was enacted making it illegal to exhibit within or without a store, or advertise by any name that a place of business is a pharmacy unless a registered pharmacist is the owner or manager A fine of $200 or thirty days in jail is imposed for violation A law was passed permitting the sale of certain medicines in stores other

than pharmacies that are distant from regular pharmacies A tax of $10 is imposed for this privilege in cities of over 5000 population and in small towns a fee of $3 is exacted Under the new regulations the number of stores dealing in drugs and medicines, outside of pharmacies, will be reduced by one half or more

A bill was introduced and passed providing for a fee of $200 for the opening of a new drug store in Connecticut The bill reads, in part as follows

'Any licensed pharmacist, or any person, firm, or corporation employing a licensed pharmacist in a pharmacy, may apply to said commission for a license to sell at retail drugs medicines and poisons to be used in compounding medicines, and to dispense at retail medicines compounded from prescriptions of physicians in a pharmacy owned or managed by such pharmacist, or owned or operated by any such person, firm or corporation provided the pharmacy shall be under the supervision of a licensed pharmacist Said commission shall grant such pharmacy license when the registration shall be for a new pharmacy on the payment of a fee of $200 and upon satisfactory evidence to said commission that such pharmacy will be conducted in accordance with the rules and regulations of said commission Renewals of such licenses shall be granted for a period not to exceed one year upon the payment of a fee of $1 When an established pharmacy shall be moved to a new location, it shall be considered a renewal "

Comment was made on this measure in the following

A fee of $1 had been enacted in Connecticut for the opening of a new drug store This encouraged the opening of stores that were unnecessary In passing the new bill officials of the State Department of Health and the State Medical Society were very helpful The distinction will be noted of a new store and one that has been licensed, when a pharmacy is moved from one location to another the fee of $1 is in force but if a new pharmacy is opened the $200 fee is required The bill provides that evidence must be given to the Board of Pharmacy that the location of such a new store is necessary Heretofore the Board of Pharmacy issued registration certificates to ten or twelve new stores annually, since the new law has become effective only one store has been registered

Relative to the sale of liquor, anyone who desires to engage in its sale must show his fitness to the Board of Pharmacy, this evidence must also be submitted to the Liquor Control Commission, to a certain extent this also applies to the right of opening a new drug store The druggist's permit allows the use of alcoholic liquors for the compounding of prescriptions and for the manufacturing of U S P, N F and other medicinal preparations provided they are not to be used for beverage purposes, but it does permit, under regulations, the sale of alcoholic liquors in quantities of not more than 1 quart and prohibits the drinking of alcoholic liquors on the premises of any drug store It will be seen that proper distribution of drug stores rests largely with the Board of Pharmacy and the State Liquor Control Commission It will not be such an easy matter to open up a new pharmacy because of these restrictions and also because of the $200 tax for the opening of a new store No applicant who has been in serious conflict with Federal regulations will be eligible for a certificate

It was stated that copies of the Connecticut legislative program can be obtained by addressing Hugh P Beirne, chairman of the legislative committee of Connecticut Pharmaceutical Association, 615 Howard Ave , New Haven, Conn

R C Wilson said that an important question was involved in the report by Mr Beirne The beer question has brought about considerable discussion and trouble as to its sale in drug stores and this applies also to the sale of liquor

W H Rivard stated that as far as he knew, there was no other agency contemplated for the sale of any alcoholic liquors, excepting in drug stores

Ralph W Clark said there had been trouble with the beer question in Wisconsin Quite a few druggists want to sell beer and many are now selling bottled beer, but there is a provision of the law which provides that beer cannot be cooled in the place of sale The cigarette and cosmetic taxes were defeated There was considerable discussion over allowing assistant pharmacists to become fully registered pharmacists without examination It passed the Legislature but was vetoed by the Governor It is understood that the bill will come up again in the special session

Due to economic conditions the pharmaceutical experiment station was practically wiped out It was expected that the appropriations would be drastically cut but it was hoped that the

station could be kept up The hectic session of the Legislature brought out coöperation among the druggists that had not obtained before

Rhode Island —W Henry Rivard stated that no drastic legislation was passed in Rhode Island No sales tax was passed and the law regarding assistant pharmacists was strengthened Provision permitted assistant pharmacists to become fully registered, which after considerable difficulty was vetoed Such a measure is apt to come up again An effort is being made to increase the membership of the State association

John P Jelinek said that in Minnesota an effort was made to register pahrmacists without examination The Board of Pharmacy had a conference with the committees of both houses and compromised It was agreed that a special examination would be held and those passed would be registered pharmacists under the Act Two examinations were held and about 140 were passed

W H Rivard said that under the law of Rhode Island there can be no further registration of assistant pharmacists Provision has been made for students in the three-year course until 1936 and for professional men who have been in business since July 1931, to become registered until 1936 Anyone who has been in the drug business for ten years as assistant pharmacist may become a fully registered pharmacist without examination

South Carolina —J M Plaxco stated that in South Carolina all the nuisance taxes had been proposed The legislative committee spent the entire session killing two general sales taxes and one other was to give physicians the right to fill prescriptions on their own premises

Mrs Fayetta Philip said that many bills were introduced in California relating to pharmacy

R L Swain made a motion that this conference of the Section on Education and Legislation, the Conference of Law Enforcement Officials, and Pharmaceutical Secretaries be continued at future meetings This was seconded and unanimously carried

Secretary Kelly expressed his thanks to the officers and those who had prepared the program and his regret, because he had not been able to attend the entire meeting

On motion duly seconded and carried the meeting was adjourned

---

REPORT OF THE 11TH ANNUAL MEETING OF THE PLANT SCIENCE SEMINAR

BY F J BACON, SECRETARY TREASURER

The Plant Science Seminar held its 11th annual meeting in Madison, Wisconsin, at the Chi Omega House from August 21 to August 25, 1933 Chairman William B Day presided at the regular sessions According to the usual custom the program was divided into scientific sessions, field trips and special lectures on subjects of interest to pharmacognosists

After registration and a short business session the Seminar visited the University of Wisconsin Medicinal Plant Garden Dr W O Richtmann conducted the group over the garden and explained the development of the garden from the very modest beginning on the University campus to the present location on University Drive The plants cultivated and the methods of cultivation employed by the Garden were explained in detail

At eight o'clock Dr M E Diemer, Director of the Diemer Photographic Laboratories, gave a lecture on Wisconsin wild medicinal plants illustrated with colored lantern slides The specimens were photographed with color plates in their native habitats and the slides prepared in true color This beautiful presentation of familiar plants was greatly appreciated by the Seminar people

Mr Leroy D Edwards, of Western Reserve University, School of Pharmacy, presented a paper on "A Study of *Cimicifuga racemosa* (L) Nutt" The author discussed the methods employed in the treatment of the drug and the results obtained Sucrose was isolated from the drug No alkaloid was obtained

Dr Heber W Youngken presented the results of his latest work on Psyllium Seed Specimens of many varieties of Psyllium were discussed, and the histology and identification of the so called "Adex Psyllium' as the fruits of *Lallemantia royleana* Benth Dr Youngken illustrated his talk with specimens and drawings and pointed out the danger of using the Lallemantia fruits as a substitute for Psyllium Seed

Dr B V Christensen of the University of Florida College of Pharmacy, presented an illustrated lecture on the Planning and Development of a Medicinal Plant Garden Dr

Christensen showed pictures of many tropical and subtropical medicinal plants cultivated in Florida and discussed their cultivation

Dr Ralph Bienfang of the University of Oklahoma School of Pharmacy, discussed the system of arrangement of drugs taken up in their courses in Pharmacognosy

The Seminar visited the Forest Products Laboratory Tuesday afternoon Small groups were formed and conducted through the Laboratory by competent guides The various projects of the Laboratory were explained In the evening Mr J A Hall, Biochemist of Forest Products Laboratory, talked to us on Biogenetics in the Terpene Series "

The Wednesday morning session was held in the Pharmacognosy Department of the University of Wisconsin Dr W O Richtmann, Professor of Pharmacognosy, explained to us the results of many years' work on the ' Sources of Information on Crude Drugs "

Dr A H Uhl, of the University of Wisconsin Course in Pharmacy, presented a paper on the "Phytochemistry of Digger Pine "

Professor C J Zufall, Purdue University, presented the results of his work on Cardamom and suggested a method of assay for the seed

The afternoon was devoted to a boat ride on Lake Mendota A stop was made to inspect the garden of Dr and Mrs Diemer

Dr Karl Paul Link Professor of Biochemistry of the University of Wisconsin, lectured to the Seminar on Recent Research on the Chemistry of Gums and Pectin " Dr Link presented to the Seminar an extremely interesting and instructive talk on the structure and chemistry of the gums so widely used in Pharmacy

The Seminar spent all day Thursday in the field, visiting Blue Mounds, Tower Hill State Park and Taliesin Art Center directed by Frank Lloyd Wright Lunch, furnished by Eta Chapter of Rho Chi Society, was served at Tower Hill at one o'clock Many specimens of Wisconsin medicinal plants were collected in the Wisconsin river valley Dr Denniston, of the Botany Department of the University, acted as guide

The Friday morning session was held at the Chi Omega House and Professor F C Claus, of the Pittsburgh College of Pharmacy, presented reprints on "Poisonous Plants of Pennsylvania, ' prepared by Dr Darbaker

A classification of our native species of the genus Mentha was given by Dr F J Bacon of Western Reserve University School of Pharmacy

Dr Edward Kremers discussed the chemistry of mint oils and brought out the biogenesis of the compounds found in the mint oils

Professor Canis, of Rutgers University School of Pharmacy, presented a paper on the meaning of Pharmacognosy and discussed the method he uses to present his course

Chairman Day opened the business session at eleven o'clock and called for the election of officers The following were elected to conduct the business of the Seminar for 1934 *President*, F H Eby, *Vice-President*, L K Darbaker, *Executive Committee*, William B Day, C E Mollett, *Secretary-Treasurer*, F J Bacon

Dr and Mrs Kremers invited the Seminar to a picnic supper at their home ' The Highlands ' After an excellent lunch served on the lawn we were entertained around the campfire by Dr C E Brown, Curator of the Historical Museum Dr Brown told many interesting stories about Wisconsin Indians

The following members and guests attended the Seminar in Madison

C C Albers, University of Texas, Mrs C C Albers
F J Bacon, Western Reserve University, Mrs F J Bacon
Ralph Bienfang, University of Oklahoma
J B Burt, University of Nebraska, Mrs J B Burt
F S Bukey, University of Nebraska, Mrs F S Bukey
O P Canis, Rutgers University
P D Carpenter University of Illinois
B V Christensen, University of Florida, Mrs B V Christensen
E C Claus, Pittsburgh College of Pharmacy, Mrs E C Claus
R W Clark, University of Wisconsin, Mrs R W Clark

William B Day, University of Illinois, Mrs William B Day
L D Edwards Western Reserve University
W W Eggleston, Bureau of Plant Industry
F H Eby, Temple University, Mrs F H Eby
P A Foote University of Florida Mrs P A Foote
E N Gathercoal, University of Illinois, Mrs E N Gathercoal
Miss Katherine Graham, University of Wisconsin
E J Ireland, University of Wisconsin
R S Justice Ohio State University
Edward Kremers, University of Wisconsin, Mrs Edward Kremers
Miss Mary Langevin, University of Nebraska
W O Richtmann, University of Wisconsin, Mrs W O Richtmann
F J Slama University of Maryland Mrs F J Slama
A H Uhl University of Wisconsin
Miss Nellie Wakeman, University of Wisconsin
E H Wirth, University of Illinois
H W Youngken, Massachusetts College of Pharmacy
Sister Mary Francis Xavier University of Wisconsin
C J Zufall, Purdue University, Mrs C J Zufall

HOURS IN EUROPEAN PHARMACIES

The International Pharmaceutical Federation has investigated the hours of opening and closing of pharmacies The questionnaire was as follows (*a*) Are there any regulations relating to the closing of pharmacies? (*b*) Are these regulations of general provincial or local application? (*c*) Are these regulations issued by some competent authority, or by pharmaceutical organizations?

Among the replies received from twenty one countries, and published in the Bulletin de la Federation Internationale Pharmaceutique, are the following

Austria —There are no official regulations In Vienna pharmacies close at 7 00 P M and this closing hour, with slight variations, is general in Austria Evening and night duty is undertaken by rota In Vienna on every second Sunday pharmacies must close from 1 00 P M until Monday at 7 00 A M, without obligation to provide a night service Service for Sundays and holidays is officially regulated

Czechoslovakia —Pharmaceutical service must be given uninterruptedly, and is regulated by a law of 1908, augmented by orders of departmental authorities which are published in co operation with pharmaceutical organizations These regulations are based on an eight-hour working day Pharmacies are open from 8 00 A M to 7 00 P M —8 00 P M In places where there is only one pharmacy the pharmacist has the right (on authorization) to close from 12 M to 2 00 P M and may close on Sunday afternoon if he agrees to supply urgent medicines

Esthonia —There is a legal obligation for a pharmacist to supply medicines at any hours This is of general application In towns with several pharmacies night service is given by districts the rota being arranged by the Director of Pharmacies Opening hours are from 8 00 A M to 8 00 P M, and may close on Sunday afternoon if he agrees to supply urgent medicines

Finland —Closing hours are not regulated by law, but an order stipulates that pharmacies must give a day or night service if required By Par 14 of an order of December 17, 1928, the medical authorities can determine the hours of service

Greece —By a decree of the Ministry of National Economy and Police, pharmacies are to be open from 8 30 A M to 1 00 P M and from 3 00 P M to 8 30 P M to 1 00 P M and from 4 00 P M to 9 00 P M in March April, October, from 7 30 A M to 1 00 P M and from 4 00 P M to 9 00 P M in May, June, July, August September These regulations apply only to towns On Sundays about a quarter of the pharmacies are open

Switzerland —Regulations for closing and hours of service vary in different cantons In the majority of towns there is a regular night service as well as a Sunday service by rota In Zurich regulations have been drawn up by the pharmacists and accepted by the sanitary authorities

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1933–1934

Office of the Secretary, 2215 Constitution Ave , Washington, D C

December, 22, 1933

LETTER NO 5

To the Members of the Council

27 Sale and Exchange of Liberty Bonds Motion No 5 (Council Letter No 4, page 1302) has been carried Before the vote was received the called bonds had declined slightly in price as compared to the uncalled bonds The registered called bonds listed were sold at 101 and the uncalled coupon bonds to replace were purchased at 101 21/32 To illustrate, two $1000 registered bonds in the Endowment Fund brought $2018 net and two $1000 coupon bonds to replace cost $2035 13 net It was decided to sell the two $100 coupon bonds in the Headquarters Building Fund and the one $100 coupon bond in the Procter Monument Fund and not replace them The former brought $101 30/32 and the latter $101 14/32

In view of the difficulty of transferring registered bonds as further issues are called and as the coupon bonds bring a slightly better price, it seemed advisable to purchase coupon bonds

28 Election of Members Motion No 6 (Council Letter No 4, page 1304) has been carried and applicants numbered 10 to 56, inclusive, are declared elected

29 Contract for Printing and Mailing the Journal of the A Ph A for 1934 The following letter has been received from Chairman DuMez of the Committee on Publications

> "I have checked over the bids for publication of the JOURNAL obtained by Editor Eberle, very closely, and I am unable to discover how we would benefit by changing the publisher at this time
>
> ' Some of the estimates are very near that of the present publishers, but the expenses in making a change would more than make up the difference
>
> "Editor Eberle informs me that the service has been entirely satisfactory and I therefore recommend to the Council that the contract for publishing the JOURNAL for the coming year be renewed with the Mack Printing Company "

(*Motion No 7*) *It is moved by DuMez that the contract for printing and mailing the Journal for 1934 be awarded to the Mack Printing Company of Easton, Penna*

At the request of Chairman DuMez a vote is called for at this time but will be considered as tentative if there is objection

30 Budget for 1934 Chairman Swain of the Committee on Finance submits, in accordance with Article II of Chapter II of the By-Laws of the Council, the following report on appropriations and expenditures for 1933, with a suggested budget of receipts and appropriations for 1934, which were prepared by the secretary and approved by the chairman of the Finance Committee The officers and Finance Committee are fully aware of the difficult times we are going through, which have resulted in reduced receipts, and several items in the proposed budget have been again reduced, while others must be increased, the total being more than one thousand dollars less than for 1933

"To the appropriation for General Expenses in 1933 nothing has been added Of the appropriations only two have been exceeded to December first, and these are within the $50 limit for which Council action is not required They are the appropriations for the Scientific Section $27 41 against $25, and the Section on Historical Pharmacy $30 97 against $25 Every effort has been made to keep the expenses below the budget appropriations Charges to December 1st were $16,071 84 as against $21,580 appropriated

"Under the appropriations for open accounts to December 1st, the JOURNAL has cost $10,791 58 against the $11 000 appropriated, the N F $4008 68 against the $1800 and the Recipe Book $56 13 against the $500 No charges were made against the appropriation of $50 for Badges and Bars Charges to December 1st were $14,856 39 against the $13,350 appropriated

"To December 1st the total budget charges were $30,928 23 against appropriations of $34,930 for the year, so we will probably not exceed our total budget

"The receipts show considerable variation from the estimates From Dues, $7727 38 as compared to $8571 88 for the same period in 1932 Every effort has been made to hold this figure up, but many explain that they cannot afford the expense Bills for dues for 1934 were mailed on December 1st, and we cannot say what the total for the year will be From the JOURNAL $7271 15 as against $7862 54, which is very satisfactory under present conditions From the N F , $3954 36 for the year as against the estimate of $3500, which is very encouraging From the Recipe Book, $894 94 for the year against the estimate of $1500, which again shows a decided decline The receipts from interest on Headquarters Building Fund will be about $5000 as compared to the estimate of $4000 $1000 was received from the U S P Board of Trustees for the YEAR BOOK, and sales were $115 19

"It has been necessary to use the income from the Life Membership Fund for the year and to transfer $5000 of accumulated interest to the Current Fund "

BUDGET FOR 1934

It is very difficult to estimate receipts under present conditions The following is suggested

Interest	100 00	
Dues	$13,000 00	
Interest Life Membership Fund	4,500 00	
JOURNAL	9,500 00	
National Formulary	3,500 00	
Recipe Book	1,000 00	
YEAR BOOK	2,200 00	$33,800 00

APPROPRIATIONS FOR GENERAL EXPENSES

No	1	Salaries	$10 800 00
No	2	Maintenance of Building	1,800 00
No	3	Telegraph and Telephone	200 00
No	4	Clerical Expenses	1,600 00
No	5	Printing, Postage and Stationery	900 00
No	6	Office Supplies	150 00
No	7	Traveling Expenses	300 00
No	8	Premium on Bonds	50 00
No	9	Auditing	75 00
No	10	Certificates	50 00
No	11	Miscellaneous	200 00
No	12	Scientific Section	25 00
No	13	Section on Education and Legislation	25 00
No	14	Section on Practical Pharmacy and Dispensing	25 00
No	15	Section on Commercial Interests	25 00
No	16	Section on Historical Pharmacy	25 00
No	17	Commission on Proprietary Medicines	25 00
No	18	Committee on Local Branches	25 00
No	19	Committee on Membership	250 00
No	20	Committee on State and National Legislation	50 00
No	21	Committee on Syllabus	50 00
No	22	Committee on Pharmacy Week	250 00
No	23	Inter-Society Color Council	25 00
No	24	International Pharmaceutical Federation	120 00
No	25	Metric Association	10 00
No	26	American Conference on Hospital Service	25 00
No	27	Headquarters Building Campaign	500 00
No	28	YEAR BOOK	3,500 00
No	29	Library	50 00 $21,130 00

APPROPRIATIONS FOR OPEN ACCOUNTS

No 30	JOURNAL			
	(*a*) Publication	$9,500 00		
	(*b*) Clerical Expenses	1 000 00		
	(*c*) Postage and Stationery	300 00		
	(*d*) Freight, Drayage and Miscel	200 00	$11,000 00	
No 31	National Formulary		1,000 00	
No 32	Recipe Book		500 00	
No 33	Badges and Bars		50 00	$12,550 00
				$33,680 00

"With these reductions it will be necessary to further curtail expenses wherever possible The reductions suggested will interfere with the work of the ASSOCIATION but not seriously It will be necessary to keep the JOURNAL within the appropriation, which will mean abstracting or condensing many papers and articles, and to advance the extra charges for the completion of the revision of the N F It is impossible to even estimate at this time what the maintenance of the Building will cost "

(*Motion No 8*) *It is moved by Swain that the budget for 1934 be approved as submitted*

With the approval of the chairman of the Council a vote is called for at this time It will be considered as tentative if there is objection

31 Selection of Auditors The Chairman of the Committee on Finance recommends the employment of W A Johnson & Co Baltimore, Md , to audit the accounts of the ASSOCIATION for 1933, in accordance with Article 8 of Chapter IV of the By-Laws This Company has audited the accounts since 1922

(*Motion No 9*) *It is moved by Swain that W A Johnson & Co be employed to audit the accounts of the Association for 1933*

32 Applicants for Membership The following applications properly endorsed and accompanied by the first year's dues have been received

No 57, Fred C Allen, Marlinton, W Va , No 58, E W Bobst, Nutley, N J No 59, Paul M Rogers, 233 High St Morgantown, W Va , No 60, Richard T Buerstatte, Jr , Manitowoc, Wis , No 61, George E Crossen, College of Pharmacy, University of Minnesota, Minneapolis, Minn , No 62, Herman Emde, 5 Besselstr Konigsberg i/Pr , Germany, No 63, Marion D Falconer 223 E Alberta St , Anaheim, Cal , No 64, Maurice Goldman 3809 Waverly Ave East St Louis, Ill , No 65, Edgar E Goulet, 443 Lake Ave , Manchester, N H , No 66, Irvine Walter Grote, 2211 Union Ave , Chattanooga, Tenn , No 67, Jonathan Gordon, 377 Eastern Parkway Brooklyn, N Y , No 68, Ernest K Hoge, 1012 Main St , Wheeling W Va , No 69, John J Law, 468 Third Ave , West Haven, Conn , No 70, Alfred Rapps, 1010 E 2nd St , Plainfield, N J , No 71, Alfred Edward Rheineck, 2469 N 2nd St , Milwaukee, Wis , No 72 Eleanor Martha Uhlir Walnut, Neb , No 73, Melvin B Vogt, 3481 Fairmount Blvd Shaker Heights Ohio, No 74, William Vollmer, 330 W 42nd St New York, N Y

(*Motion No 10*) *Vote on applications for membership in the American Pharmaceutical Association*

33 The Headquarters Building The offices of the ASSOCIATION will be removed from 10 W Chase St , Baltimore, Md , to the Headquarters Building, 2215 Constitution Avenue, N W , Washington, D C , on or about January 1, 1934

The grading of the grounds was completed sometime ago The approach-steps are nearing completion and the roadway across the grounds in the rear of the building is completed The top-soiling is being done as well as part of the planting and seeding The remainder of the planting and seeding will be completed early in the spring

The grading, approach steps and roadway are being done by the George A Fuller Company, Washington, D C , and the top soiling, seeding and planting by the Westcott Nurseries, Falls Church, Va The Office of John Russell Pope is supervising all the work and Mr A F Brinckerhoff, New York, N Y , is the consulting landscape architect

A decision has been secured from the authorities of the District of Columbia that the building and grounds will be free from taxation after occupancy

E F KELLY, *Secretary*

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council" —Part of Chapter VI, Article VI of the By Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By Laws of this Association"

ARTICLE IV of Chapter VII reads 'Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

BALTIMORE

The regular monthly meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Hotel Emerson on January 3, 1934 President Solomon, in the chair called for reports of the various standing committees and for the secretary-treasurer's report for 1933

The secretary read the report for the past year and noted a marked improvement in the attendance The treasurer's report was then read The financial status of the Baltimore Branch is sound with a comfortable balance of over $200 on deposit The reports of the secretary treasurer were accepted

Dr Swain, chairman of the Committee on Legislation and Education, reported on the fate of the Uniform Narcotic Act in Maryland, the Liquor Bill, the N J Legislation on tolerances on prescriptions the Kansas Drug Store Registration Act, the Kentucky Pharmacy Act, the Drug Store Ownership Laws, and the new Federal Food and Drugs Act

B Olive Cole, chairman of the Membership Committee, reported that membership in the parent organization in Maryland has held up very well

Marvin J Andrews, chairman of the Committee on Science and Practice of Pharmacy, reported in detail the research work carried out in Baltimore at the Emerson Drug Company, the Department of Pharmacology of the School of Medicine, University of Maryland, the Maryland State Department of Health, Hynson, Westcott and Dunning, and the School of Pharmacy, University of Maryland

The secretary expressed the regrets of Editor Eberle, chairman of the Committee on Professional Relations, for not being able to attend the meeting and read the report of this committee

The committee reports were accepted as read

Mr Black, the first speaker of the evening, presented an interesting paper in which he stressed the importance of careful dispensing He further urged that a more friendly cooperation should be attempted between physicians and pharmacists

Mr Meyer, a retail pharmacist of many years' experience, presented an interesting demonstration and display of the many devices which he employs in his business to increase efficiency

Thanks were extended to the speakers President Solomon then called upon Mr Lowery of the Nominating Committee for a report The following were nominated and duly elected to office for the year of 1934 *President*, B Olive Cole, *Vice-President*, W F Reindollar, *Secretary-Treasurer*, C Jelleff Carr

After the installation of President Cole, Dr Swain presented a motion, which was carried, that the Branch present yearly another membership in the A PH A to a student in the School of

Pharmacy, University of Maryland, to be selected by the Faculty This membership was also to carry with it membership in the Baltimore Branch

After a few words about arrangements for the February meeting a motion for adjournment was passed

C JELLEFF CARR, *Secretary-Treasurer*

CINCINNATI

The last regular meeting of the Cincinnati Branch, A PH A, was held Tuesday night, January 9, 1934, at the Cincinnati College of Pharmacy

President Sondern introduced Dr Shiro Tashiro, professor of Biochemistry at the College of Medicine, University of Cincinnati Dr Tashiro spoke on, "Pharmacy in the Orient" This subject could well have borne another title as he explained in the beginning of his talk Dr Tashiro dwelt chiefly on the superstitious ideas, beliefs and odd remedies as he remembered them practiced in his native land years ago It was shown, however, that many of these odd remedies have since been exonerated by the teachings of modern science Proof of this was amply given in his examples of the school boy, the chewing of water, the death of the town barber, etc In 1895 Dr Tashiro's village felt the influence of the Occident From that time on Science became the God of the people and the West their ideal

Dr Tashiro was given a standing vote of thanks

The minutes of the previous meeting were read and approved

The report of the Committee on Pharmaceutical Jurisprudence was submitted by Mr Freericks He told of a proposed amendment to the Food and Drugs Act written by Dr Beal This contains some very desirable features, particularly that dealing with a partial disclosure of formulas of a toxic nature Dr Copeland, he reported, is also rewriting his proposals Mr Freericks requested that in order to make better reports on this committee the members ask specific questions

The report of the Publicity Committee was given by Mr Henke All papers were notified of this meeting and one gave generous space to the details of Dr Tashiro's speech

Mr Cassidy reported for the Drug Products Committee This committee will report on new products on the market and investigate and report on those of dubious nature Mr Cassidy reported on the new British product of Pure Vitamin C in crystal form A detailed report on this product will be given at the next meeting

A motion was made, seconded and passed that the Branch appoint an historian

The secretary will endeavor to get more space in the JOURNAL for the reports of our meetings

Mr Jennie in behalf of the O V D A invited all members to attend the installation of officers of the organization at the Netherland Plaza, January 30, 1934

The meeting adjourned and all members partook of refreshments ably handled by the Refreshment Committee

R L PULS, *Secretary*

DETROIT

The meeting of the Detroit Branch, AMERICAN PHARMACEUTICAL ASSOCIATION, was held on the evening of December 21st at Webster Hall Due to the absence of the chairman, Henry Tyszka presided Secretary Bialk was absent on account of illness and Prof Charles H Stocking acted as secretary *pro tem* The minutes of the November meeting were read and approved

Secretary S R Klegan of the Detroit Registered Pharmacists' Association explained the purpose and aims of the organization In part, he said, "The purpose of the drug clerks' organization is not to hold a club over the heads of the proprietors to compel the payment of higher wages, but rather to work with the proprietors in an effort to assist them to make larger profits so that the payment of higher salaries will become possible He further stated that the new organization came into existence because the clerks did not feel that they could secure the desired results through active membership in the Detroit Branch, A PH A as it attracts into its ranks only the best element in pharmacy and therefore efforts to bring influence to bear upon the less desirable members of the profession would be lost"

Mr Klegan stated that the members of the Registered Pharmacists' Association do not expect to dictate to their employers nor to use the labor union methods to achieve their aims He was of the opinion, however, that much good could come to clerks and proprietors through the activities of the association

L A Seltzer contended that the proprietors have serious problems of their own and that in no business is the interest of the clerk and that of the proprietor so closely related as in pharmacy He thought that closer cooperation between the clerks and the proprietors could be best worked out through the medium of the friendly exchange of ideas in an organization such as the Detroit Branch, where both classes meet on an equal footing This opinion was shared by James Liddell, who stated that the clerks profit by the experience of the older members

Dean R T Lakey complimented the new organization on the initiative shown by the membership in attacking the problems of the clerks and stated that he felt much good could be accomplished He contended that because of the large number of clerks, compared with the number of drug store owners in the state, great power lies dormant in the hands of the clerks

The meeting was well attended, considering the fact that it was scheduled so close to the holiday season

CHARLES H STOCKING, *Acting Secretary*

NEW YORK

The December meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the Brooklyn College of Pharmacy, Long Island University, on December 11, 1933 There were about sixty members and guests present

Vice President Ballard was in the chair and he expressed the regrets of Dr Bilhuber for his inability to attend The report of the secretary was read and accepted

Chairman Lehman, of the Education and Legislation Committee, reported three points of importance,

First The NRA Retail Code is unsatisfactory Considerable difficulty is being experienced with the definition for cost of merchandise

Second The Tugwell Bill Objection is being raised to the 'one man rule'

Third Passing of prohibition, Mr Lehman called attention to the fact that a physician's prescription is still necessary in the sale of liquor in a drug store The sale of alcohol is prohibited

Chairman Kassner, of the Membership Committee, reported Mr Bragger, a new member for the Association

Dr Arny reported on the organization meeting of the Northern New Jersey Branch of the A PH A

Vice-President Ballard appointed a nominating committee to report at the next meeting *Chairman*, Hugo H Schaefer, R A Lehman and Reginald Dyer

Dr Ballard then called upon Mr Heimerzheim to say a few words regarding Dr Joseph L Mayer, whose untimely death had occurred but a few days before the meeting Mr Heimerzheim spoke of Dr Mayer as a classmate and friend, and called attention to the sincere and faithful service performed by Dr Mayer in his work in the Brooklyn College of Pharmacy

Members and guests were asked to rise and stand in silent tribute to a beloved member

Chairman Heimerzheim, of the Committee on the Progress of Pharmacy, then reported the following

1 Investigations have shown that the rate of deterioration in aqueous solutions of gallotannic acid preserved at a temperature of 60° to 65° F is negligible over a period of six months

2 The modern treatment of strychnine poisoning consists chiefly and preeminently in the intravenous administration of sodium amytal

3 Alkali stannites are now being used as active ingredients in preparing depilatories

Dr Ballard then introduced the speaker for the evening, Dr Ralph Holt Cheney, who spoke on the "Relation of Caffeine and Coffee to Human Efficiency" (To be published in a succeeding number of the JOURNAL)

At the close of Dr Cheney's address there was some discussion, and after the speaker had answered numerous questions the meeting adjourned RUDOLF O HAUCK *Secretary*

NORTHERN NEW JERSEY

The fourth regular meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was called to order by President Little on December 18th

After a brief word of greeting to the many visitors by the president, our first two new members, Doctor L K Riggs and Professor W L Sampson, were introduced, and the fourteen persons whose names follow were nominated for membership in the branch and elected They are Hyman Aberbach, Philip Basson, Annabel Beaty, John J DeBus, John G Graef, Albert Hawes Milton Kahn, George Lordi, O H Florenzie, Abram Mosler, Janette B Osofsky, W H Owens Alfred Rapps and Robert Wuensch

A special occasion was made in the subsequent program of the association for the election of Dr R L Swain to honorary membership The branch is very proud to have as its first honorary member the president of the parent body

One of the most interesting reports of the evening was that presented by Mr Mecca, speaking for the Professional Relations Committee He outlined plans for two joint meetings to be held in the early spring, one with the physicians, and the other with the dentists Features at both programs will be combined lectures and demonstrations on things pharmaceutical which will be of considerable interest to our professional friends

Professor Cox, reporting for the Committee on Science and Practice of Pharmacy discussed some of the recent advances in manufacturing, the desirability of state boards being more careful about the character of licensed pharmacists, the future of liquor in drug stores, the work of the New York State Board in analyzing samples of merchandise purchased at cut rate drug shops, and Judge Pound's decision that Pharmacy is a profession, analogous from a training standpoint with law and medicine

At the completion of the regular order of business President Little introduced Mr Vail, of Becton, Dickinson & Company who gave us a very nice prologue to the instructional entertainment his company was presenting as the feature of the evening This was to be a lecture and bench demonstration on the manufacture and use of clinical thermometers

When Mr Vail had concluded his talk W G Meriam began the lecture with the story of the development of the thermometer from the first crude instrument of Galileo to the precision clinical thermometer of to day As he began discussing the bench work involved in the making of thermometers, Hugo Barthen, his assistant, carried out each delicate operation while it was being explained The intricacies of the manufacturing processes were most capably demonstrated After the formal talk the meeting was adjourned and we were permitted to gather around the work bench where both Mr Barthen and Mr Meriam were kept busy with repeated demonstrations and the answering of questions L W RISING, *Secretary*

NORTHERN OHIO

The Northern Ohio Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION met January 12, 1934, at the Faculty Club of Western Reserve University, twenty-two members were present

After installation of officers for the new year (the names of the new officers are listed in the roster of the A PH A, Local Branches of THIS JOURNAL) the time of the meeting was taken up with the discussion of a newly adopted method for contacting the 1400 physicians whose names appear on the roster of the Cleveland Academy of Medicine Hereafter bulletins of a general nature only will go directly to physicians, while members of the Academy of Pharmacy will be supplied with sufficient type prescription cards and information that will be serviceable when the physicians of their neighborhood are detailed or contacted

PHILADELPHIA

The December meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Philadelphia College of Pharmacy and Science on Tuesday evening, December 12, 1933

The meeting was called to order by President Eby, who notified the assembly of the recent death of Mr Joseph W England, president of the Branch in 1921, and appointed Dr LaWall and Dr Krusen as a Committee to draw up a resolution of sympathy to be presented by the Phila-

delphia Branch to the family of the deceased Dr LaWall recalled phases of Mr England's life bearing on the advancement of American Pharmacy

Ivor Griffith, speaker of the evening, Associate Professor of Pharmacy at the College, Director of Research at the Stetson Laboratories and Editor of the *American Journal of Pharmacy*, was then introduced to present the topic "Dyes and Disease"

He began with a history of the use of dyes therapeutically, giving his version of the discovery of the famous "Perkin's Purple" in 1856 during the search for a synthetic quinine With a lecture table experiment he then produced a quantity of the 'Perkin's Purple"

Professor Griffith stated that the dyestuffs commonly used in medicine were mostly toxic, especially the basic dyes, and that in dilute solutions they were antiseptic Reduction of surface tension was suggested as a topic of research in the medicinal use of dyes The textile industry has developed certain detergents which reduce the surface tension of the dye bath, thus permitting greater penetration The therapeutic value of many dyes could be greatly enhanced if the surface tensions of their solutions might be reduced To be of value in the treatment of disease a dye should persist in the tissue until its work is accomplished, and then disappear Mention was made where overdoses of certain dyes produced startling results and changes in the appearance of the patient

Professor Griffith confined his talk mainly to a discussion of the chemical dyes of the basic and fluorescein groups With regard to the recent use of methylene blue as an antidote in carbon monoxide and cyanide poisoning, he said that it was now supposed that the dye occupied the place of the oxidizing enzyme in the blood, until recovery enabled the enzyme to again function properly

The lecture was accompanied by a series of practical experiments illustrating the properties of the dyes mentioned Charts were displayed, one showing 22 possible colors obtainable by combining three dyestuffs of cardinal colors The new 1934 color chart displayed the 80 colors to be used by clothing manufacturers during the coming year and Professor Griffith said that to date about 1500 color shades were on record

At the close of the lecture Dr LaWall commented on the use of dyes in food coloring, and said that vegetable colors were not the only ones suitable, and that many synthetic dyes could be used satisfactorily

Dr Munch made some interesting comments on the poisonous effects of certain dyes that have been used as food colors Dr Bird announced the possession of a sample of the original mauve, so popular in England after its discovery, and offered to share his sample with the College Museum This offer was accepted on behalf of the curator by Dr LaWall

The meeting adjourned at 9 45 with a rising vote of thanks to the speaker

E H MacLaughlin, *Secretary*

PITTSBURGH

A meeting of the Pittsburgh Branch of the American Pharmaceutical Association was held Tuesday evening, January 16 1934, in the main lecture room of the Falk Clinic at 3601 Fifth Ave

PROGRAM

"Exhibition of X-ray and Fluoroscopic Technique," Mr John Russell, Falk Clinic 7 30 to 8 30 P M

A discussion of Mouth Antiseptics and Dentifrices," W Harry Archer, D D S, Dental School, U of Pittsburgh

' Analgesics, Anodynes and Sedatives Used in Dentistry," W Paul Walker, D D S, Dental School, U of Pittsburgh

---

Wilbur L Scoville, for many years member of the technical staff of Parke, Davis & Co, well and favorably known for his work in the advancement of pharmacy, is on the retired list Mr and Mrs Scoville are now in Florida No doubt Professor Scoville's activities for pharmacy, especially in the revisions of the U S P and N F, will long continue Best wishes for health and happiness are extended

SYMPOSIUM ON PRACTICING PROFESSIONAL PHARMACY *

How Hospitals Can Profit by Adopting a Formulary and Chart and Engaging the Services of a Registered Pharmacist

BY HARRY E. BISCHOFF

There are generally four types of Hospitals

1st—Municipal

2nd—Those partly supported by municipal appropriations

3rd—Incorporated institutions financed by endowment by religious or civic organizations or by individual support

4th—Private Hospitals

The second and third types are greater in number as they embrace all hospitals operating under the auspices of religious and civic organizations. Even in big cities where there are City Hospitals, there are usually a number of these privately or semi-privately operated hospitals which as a whole, render far more service than the city institution.

To install a pharmacy or a pharmaceutical laboratory in a hospital where none has operated, it first becomes necessary to persuade the governing body that it will save the institution money. This is preferably accomplished through the Superintendent or Medical Director or whoever may be the directing head. The plan should be referred to the Medical Staff and a committee appointed, representing all departments of the hospital and including a trained pharmacist. A competent pharmacist, through his familiarity with ethical medicines and official titles and costs of drugs, can be of much assistance in preparing a suitable Formulary and in advising upon the available standard medicines and their price in comparison with the many specialties. The pharmacist necessarily must be conversant with medical terms, action of drugs, types of medication and, principally, comparative costs of proprietary and official preparations. He must drive home the point that all standards for drugs and medicines are defined in the U. S. P. and N. F., and manufacturing firms have only one recourse and that is to buy their supplies through the same sources that pharmacists do, hence fancy names naturally command fancy prices. To put into effect the prescribing for U. S. P. and N. F. drugs and preparations in lieu of proprietaries, a Hospital Formulary and Chart are needed to properly carry out the plan since without them the staff has no guidance.

To win the support of the Medical Staff, first of all their pharmaceutical needs should be taken into consideration as they generally have some pet formula. How to thought of teaching the internes the art of prescribing is the next feature. This will be one of the duties of the staff in rounding out the experience and practice that internes must necessarily obtain in hospitals. Most State Boards demand at least one year of rotating service in Class A Hospital as a requisite before taking state examinations and the Formulary in this way aids as a course in Materia Medica and the allied subjects that they are examined in. Hospital Staffs are just as zealous of the records of their internes taking state examinations as are the Schools of Pharmacy. The Staffs of hospitals watch more closely the results of state examinations regarding their internes than they do the schools from which they graduate.

The Hospital Formulary should be published in a practical manner in order that it can be readily referred to.

In addition to the printed Formulary the formulas are also printed on a chart. This is put up in all wards, clinics and at each floor supervisor's station and can readily be referred to by those on service, should they be without their Formulary, which is of pocket size. As a matter of fact, the charts are referred to more frequently than are the books. The books are generally perused leisurely at the office of the practitioner or by the internes during rest periods. This also encourages the practitioner to prescribe U. S. P. and N. F. preparations in his regular practice and is far reaching in its influence. As for the interne, it is the means of educating him to prescribe other than proprietary preparations and when he opens his office, he is not so likely to write for the many specialties which are ordinarily found on his prescriptions.

---

* See page 1021, October JOURNAL, and page 1279, December issue

The nurse, also profits immensely by knowing the chart as it affords her the opportunity to study the medicinal terms and greatly aids her with her materia medica

Most hospitals to day are endeavoring to make each department carry itself from a stand point of costs, and it is a known fact that the Pathology department and the X-ray department show a profit often in sufficient amount to carry their clinics

The drug department at the North Hudson Hospital also provides an income, for as each patient is billed for a laboratory charge (this work is compulsory by a ruling of the American College of Surgeons in order to attain a class 'A" rating) and for X ray work, if the same is neces sary, so are they billed for medication, whether they be ward or private patient If ward patients—at a minimum charge, just sufficient in amount to cover costs, if private—at usual prescription rates Of course if a flat rate is given for ward patients, including all costs, neverthe less, the work done in the pharmacy is billed to the office and the pharmacy credited, just as they bill and receive credit for private work At the North Hudson Hospital prescriptions are billed for both ward and private patients under one listing In order that this may be properly summed up, the important facts are as follows this Hospital, a general hospital of 160 beds 2 operating rooms, doing all types of work (except handling contagious diseases), has day and night ambulance service and 11 different types of clinics, and giving medical and surgical service The pharmacy only handles drugs and medicines The control of gauze, cotton, etc , is under another depart ment, whereas, some hospitals include these with their drug department All chemicals, phar maceuticals, drugs, etc , such as disinfectants, etc , are charged to the institution as a whole, whether it be a general laxative or anything else—at cost price

For comparative purposes, the records of 1931–1932 speak for themselves

	1931	1932	Increase
Prescription Account	$4050 69	$5133 65	$1082 96
House Account	3847 15	3714 66	—132 49
	$7897 84	$8848 31	$ 950 47

You will note that the House Account was slightly less in 1932 than in 1931 and this was, principally, because prices were lower as the amount of materials used was greater in quantity The largest items in the House Account are principally for disinfectants and germicidal agents such as Liquor Cresolis Compositus, Liquor Soda Chlorinata and Liquor Formaldehyde, etc , for washing floors, etc

Bearing in mind the fact that costs were much higher in 1931 than 1932, the above figures prove that the Staff favors this service more than ever and appreciates the fact that U S P and N F preparations meet all medical needs because there are no "patents" or "proprietaries" whatsoever in our drug department

This year to date, notwithstanding the times and costs, the Drug Department is showing even a greater income Of course, the wards are overflowing and private rooms are now usually occupied by ward patients at ward rates, which also means medication at cost

The cost of installing our Pharmacy fully equipped, which replaces our former drug room, was accomplished at a cost of less than $900 This includes everything—carpenter work for making of the counter, drawers, shelves and closets, plumbing work of replacing a small sink with a large deep sink with a single unit for hot and cold water faucet with foot control, large enough to wash and clean five gallon containers, electrical work of installing 4 outlets for lights and gas connections for 2 burners The balance was spent on utensils, bottles, jars, spatulas, scales weights, mortars and pestles, pill machine, graduates, etc The stock bottles for galenicals, etc , costs were nil because these were collected over a period of time and we painted the names and numbers on them with white enamel which permits washing and keeps for about three to four years, even under constant usage This not only kept down the costs but is also far more satisfac tory than paper labels, and superior to glass labels, which crack and break These containers can be readily washed and kept cleaner, and the labels are more durable When I say fully equipped, I mean just that, since this figure includes stock of galenicals, chemicals, drugs, etc , for about four to five months' supply Some, of course, last longer, while others are continually being reordered

We have a full-time pharmacist who works from 9 00 A M to 5 00 P M and two nights a

week from 7 00 to 8 30 o'clock Sundays and holidays he is on from 9 00 A M until 12 00 A M He has the assistance of a clinic nurse when necessary, and the cleaning is done by a porter

The cost of materials and supplies for 1931 were $1769 19 and for 1932 they were $1235 37 There were some additional interlocking items that partly belonged to the drug department but because they were principally for the pathology or other departments, they were charged elsewhere At the most, they wouldn't amount to more than $200 during any year

These facts presented show that a drug department can produce equally as much revenue as the Pathology or X-ray departments of hospitals, if properly handled The profit for 1931 was approximately $4208 65 and for 1932 it was $4672 94, against which should be charged space consumed, light, heat, water, insurance and depreciation

If an attending physician wishes to prescribe a proprietary for a private patient, that is his privilege, it is procured elsewhere However, for ward and clinic cases, the Staff is subject to rules and must confine its prescriptions to official drugs or preparations At first this was an effort, but after they found that they obtained results from official preparations, the battle was won I clearly proved the efficiency of many official drugs, but the most outstanding was that of Digitalis, which is used as much as any drug in a hospital Most physicians have a favorite proprietary Digitalis preparation, so the opportunity to demonstrate the action of a standardized Powdered Digitalis was easily accomplished with wonderful results and much satisfaction They also like to change their vehicles and they are now using some that they never before knew were official, such as Syrupus Cacao, Syrupus Idei, etc

The Internes particularly appreciate the Formulary as it affords them every opportunity to prescribe They also use the same for reference purposes as to action of drugs

The Nurses are also pleased because they use the Formulary in their studies

Since it is one of the functions of a Superintendent to keep down costs, it is not necessary to elaborate on his reactions but I briefly want to say that the Superintendent once said in his monthly report ' The installing of our new drug department not only permits our Staff and Internes to practice better medicine but also has been the means of lowering costs " Our drug bills now prove to be $200 less a month than heretofore

After having this Formulary copyrighted, more than 50 requests were received from different hospitals throughout the country but particularly from the northern section, east of Chicago I have in most instances forwarded a copy, also a Chart, and in a few cases have permitted them to make copies of the Chart, hoping that it would be the means of creating positions for Pharmacists, and of impressing the American College of Surgeons and the American Medical Association with the importance of including a Pharmacist with their other requisites for a Class "A" rating for hospitals

---

PILLS AND TABLETS FOR INTESTINAL MEDICATION

Drugs that have to pass through the stomach unchanged, but which must dissolve readily in the intestinal secretions have in the past been coated with keratin or acted upon by formaldehyde Cellulose esters and ethers have also been suggested, but they are unsuitable in the pure state They are rendered suitable by a newly patented process, which consists of embedding particles of a substance more easily attacked by intestinal ferments in cellulose ester substance Examples of embedding materials are fats, oils, waxes, lipoids and bile acids When added to a cellulose ester or ether the latter becomes readily soluble in intestinal ferments For example, the drug mixture may first be mixed with the pill forming substance or filler, and then the pills are dipped into a solution consisting of equal parts of 5 per cent nitrocellulose and 5 per cent olive oil in an alcohol-ether mixture A rapidly hardening skin is obtained over the pills The pills may be coated with a thin sugar-gelatin layer and then dipped into a solution of 5 per cent cellulose acetate and 5 per cent castor oil in acetone Capsules may also be made from a mixture of 5 per cent nitrocellulose and 5 per cent lecithin dissolved in equal parts of alcohol and ether The capsules are then filled with the drug They will not dissolve in the stomach, but will readily dissolve in the intestines —(*Drug and Cosmetic Industry*, 4 (1933), 471)

EDITORIAL NOTES

Because of removal from Baltimore to Washington, of Association Reports, which required many pages, publication of a number of papers and items in this Section had to be deferred We hope to have the work properly adjusted for the next issue of the JOURNAL

THE BRITISH PHARMACOPŒIA

The Pharmacopœia Committee (British) of the General Medical Council reports that the Pharmacopœia Commission took office on October 1, 1933, and since then have held two meetings They have arranged the allocation of the work of revision among the members of the Commission, and have drawn up a provisional scheme for the formation of Sub Committees to conduct investigation and inquiry on special subjects germane to Pharmacopœia revision They have under consideration a proposal for the preparation of an Addendum to the British Pharmacopœia 1932, which shall include any changes in the standards of the British Pharmacopœia 1932 which may, after due consideration, be thought necessary, together with monographs on such new drugs as may be considered suitable for official description

The Commission now has its own research laboratory The total number sold of copies of the recent revision of the British Pharmacopœia is 33,095, *i e*, according to the last report we have seen, which number is doubtless, much larger by this time

MEMORIAL TO HENRY GEORGE GREENISH

The Council of the British Pharmaceutical Society of the School of Pharmacy Students' Association have formed a committee to decide upon and raise a fund for a memorial to the late Henry George Greenish, which will be in addition to the formal memorial to be set up by the Council

Professor Greenish was a member of the Society's School of Pharmacy for about 50 years and active in all British pharmaceutical affairs He was an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION (see Obituary, page 925, volume XXII) Subscriptions may be sent to the Joint Honorary Treasurer, 17 Bloomsbury Square, remittances are to be made payable to the Greenish Memorial Appeal Committee

PLAQUE OF DR LONG PRESENTED TO MURPHY MEMORIAL

The Fellows of the American College of Surgeons living in Georgia presented a bronze plaque bearing the likeness of the late Dr Crawford Williamson Long, discoverer of ether anesthesia, to the John B Murphy Memorial Building, Chicago, Ill The plaque, which reposes in a niche in that building, was appropriately unveiled before the Clinical Congress of the American College of Surgeons

VANCOUVER DRUGGISTS UTILIZE DRUG STORE SURVEY REPORT

At a recent meeting of retail druggists of Vancouver, B C, it was announced that the executive committee had mailed to all members a bulletin entitled, "Druggists Show Wide Variance in Pricing Prescriptions' The bulk of the text of this bulletin was based on a report evolved from the national drug store survey entitled "The Professional Pharmacy" The Canadian association closed the bulletin by stating that druggists would profit by following the suggestions dealing with prescription prices Reprints of "The Professional Pharmacy" (price 25 cents) are being prepared and may be obtained from the AMERICAN PHARMACEUTICAL ASSOCIATION, 2215 Constitution Ave, Washington, D C

TREATMENT OF NARCOTIC DRUG ADDICTS AT FEDERAL NARCOTIC FARMS

A new experiment in the treatment of drug addicts will be made possible when the Federal narcotic farms at Lexington, Ky, and Fort Worth, Tex, now under construction, are completed and the 1800 drug addicts in Federal prisons are transferred to them

Under the supervision of the Public Health Service, it is planned to develop these institutions as research centers for the treatment of addicts An advantage which they will have over private institutions of a similar nature, it is pointed out by officials of the Service, is that any program decided upon can be enforced upon those receiving treatment

The Service finds that the cause of narcotic drug addiction are of three types Approximately 70 per cent of the present day addicts took up the use of narcotic because of contacts with other addicts, chronic and painful illness was responsible for about 25 per cent and the remaining 5 per cent are due to other causes curiosity, fatigue and the like

Mental attitude and a predisposition toward use of drugs are responsible for about three fourths of present day addiction according to the Service

The Service concludes that various experiences indicate that a narcotic addict with a normal mental background will not long continue as an addict for narcotics are unnecessary for the comfort of one who enjoys good mental health

AGAR EMULSION OF HEAVY LIQUID PETROLATUM

Heavy Liquid Petrolatum	[illegible] cc
Agar	[illegible] Gm
Sucrose	100 Gm
Acacia, in fine powder	60 Gm
Tragacanth, in fine powder	10 Gm
Tincture of Vanilla	[illegible] cc
Tincture of Lemon	[illegible] cc
Oil of Cassia	0.5 cc

Water, a sufficient quantity to make 1000 cc

Dissolve the agar and sucrose in 300 cc of boiling water, and strain the liquid through gauze into a suitable vessel Set aside until it is cool but not jellied Incorporate the powdered gums in a capacious mortar with the heavy liquid petrolatum Then gradually add the agar solution, thoroughly mixing the liquids with the aid of an egg beater Finally add the tinctures and oil of cassia and sufficient water to make the product measure 1000 cc — A PH A Recipe Book," page 197

TWO NEW JERSEY LAWS

Robert P Fischelis comments on two New Jersey laws in the following

The New Jersey hypnotic drug law represents the first attempt on the part of any state to limit the dispensing of drugs and preparations containing barbital, chloral hydrate, paraldehyde, sulphonal, trional, tetronal, carbromal and chlorbutanol to prescriptions of physicians, dentists or veterinarians One of the effects of this law is to automatically curtail the sale of these products in stores which do not have a prescription department operated or managed by a Registered Pharmacist

The prescription law definitely establishes a routine for compounding, recording, filing and dispensing prescriptions It will be noted that the regulations prescribe the equipment and apparatus required or the establishment of a prescription department and it is authorized under the law to establish tolerances for prescription work This is the first time that a Board of Pharmacy has been authorized to make regulations for the establishment of tolerances to allow for deviations from the amounts of ingredients prescribed, due to manipulative procedures and deterioration Dr Fischelis states that this prescription law and the regulations will go a great distance toward safeguarding the compounding of prescriptions and restricting it to properly qualified pharmacists

NRA PREPARES TO ORGANIZE INDUSTRY FOR ADMINISTERING OF APPROVED CODES

The Washington correspondent of the *Oil, Paint and Drug Reporter* states that plans for transforming the National Recovery Administration and the trade associations operating under it from code drafting organizations into code administering organizations have been virtually completed and will be announced in tentative form within a few days

Following this a general congress of all code authorities, 150 or more, will be called in Washington probably about February 15th This group will discuss with Administrator Hugh S Johnson and his staff the many problems involved in operating under an approved code Formal promulgation of rules governing code authorities will not be made until after this gathering

Meanwhile, the NRA is giving properly organized code authorities the temporary power to handle trade practice violations and complaints Permanent plans, however, call for retaining enforcement powers in the hands of the government

LOS ANGELES FLOOD

The California flood caused large property loss and damage, especially in the Montrose-Glendale section of the Los Angeles suburbs Comparatively small loss was sustained by the druggists, but to their credit good service was rendered by the pharmacists in serving others with first aid and medicines

NEBRASKA ASSOCIATION

The 53rd annual convention of the Nebrasl a Pharmaceutical Association will be held at Omaha, May 7th–9th, with headquarters at the Paxton Hotel The date of the convention is one month earlier than that of previous years

GOLDEN ANNIVERSARY MINNESOTA PHARMACEUTICAL ASSOCIATION

Minnesota will celebrate for nearly a week, commemorating the fiftieth anniversary of its organization Tuesday February 13th—addresses will be made by Mayor Bainbridge, President Elect of Montevideo, Theodore A Arneson, O P Cleaver, who had a large part in arranging the lighting effects at A Century of Progress Opening of the Drug Show by President J P Jelinek Banquet

Wednesday—Scientific and Practical Section Northwestern Branch, A Ph A under direction of Dean Wulling President's reception and ball

Thursday—District Meetings, banquet

Friday—Conclave of Veteran Druggists social gatherings and various district meetings —Hugo O Peterson is chairman of the Committee on Arrangements

PERSONAL AND NEWS ITEMS

Dr George Barger—well and favorably known for "high excellence in the prosecution or promotion of original research in the Chemistry and Natural History of Drugs"—has been awarded the Hanbury Medal Dr Barger is author of 'Ergot and Ergotism," he is a member of the faculty of Edinburgh University

The University of Paris has conferred the Doctor's degree on **Prof L Van Itallie**, University of Leyden He is an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION Dr Van Itallie is president of the technical commission of the League of Nations for the standardization of the analysis of opium, he is professor of toxicology and pharmaceutical chemistry, University of Leyden

Dr John Jacob Abel, in his presidential address before the American Association for the Advancement of Science, included the following striking statements

"We ourselves are walking drug shops An experienced chemist or pharmacist would have no difficulty in preparing arrow poisons from some of our own organs that would have delighted the heart of primitive man I incline to the belief that no living cell exists whose contents or metabolites are not toxic to some other living cell"

Prof Heber W Youngken, of the faculty of the Massachusetts College of Pharmacy, presented two papers during the convention of the American Association for the Advancement of Science held in Boston The first of these was entitled An Investigation of the Viburnums and Their Medical Aspects' which was given before the Section on Medical Sciences, at the Boston Medical Library on Friday, December 29th The second, delivered before the General Section of the Botanical Society of America, at Mallinckrodt Hall Harvard University, on December 30th, was entitled A Comparative Study of the Seeds and Spikes of Certain Caulescent Species of Plantago" Both papers were illustrated with the lantern

Prof Marston T Bogert, head of the department of organic chemistry at Columbia University, has been appointed a member of the Board of Directors of the Florida Research Institute, whose headquarters are at Eustis, Florida

Colonel Samuel Price Wetherill, Jr, president of the Philadelphia Art Alliance and member of the executive committee and former president of the Tri-State Regional Planning Federation was elected chairman of the Board of Trustees of the Philadelphia College of Pharmacy and Science at a meeting of the trustees January 9th He succeeds Joseph W England who had been chairman from 1924 until his death December 2nd He is the great great nephew of Samuel Price Wetherill who was the presiding officer at the meetings of the Philadelphia College when it was organized in Carpenter's Hall, Philadelphia, in 1821

Dr R L Swain was speaker at the meeting of the Maryland Academy of Medicine and Surgery on January 15th The address was under the auspices of the U S P and N F Publicity Committee—the subject of Dr Swain was "The U S P and N F—Their Relationship to the Costs of Medical Care"

Ambrose Hunsberger has resigned as member of the N A R D executive committee

Governor Albert C Ritchie, of Maryland, in an address said

'A great many people of whom I happen to be one, still believe that the business stability of this nation depends upon the self-reliance

and initiative, the energy and unfettered industry of independent men and that our national happiness and prosperity will not survive if the independent merchant—the grocery store, the drug store, the retail store, the corner store and the neighborhood store—are overwhelmed by mass wealth and by giant size and power"

Prof Karl Sudhoff, formerly of the University of Leipzig, where he held the chair of History of Medicine celebrated his 80th birthday, November 26th Lately, he has devoted his chief energies to research on Paracelsus, whose medical writing he is publishing in an imposing edition

John O'Brien, Omaha pharmacist Pharmacy Week prize winner of 1932, has developed the professional side of his drug store—the returns from prescriptions represent 50% of the total volume of the gross income *The soda fountain* is Mr O'Brien's hobby and represents one-third of the total sales volume

E V Lynn spoke before Phi Sigma, Washington State University, at its recent meeting on "Biology in Relation to Drugs"

Dean C W Johnson, who became seriously ill on the train bound for the Madison A PH A meeting, has taken up his work as dean and on the faculty

G H P Lichthardt is now connected with California Department of Public Works (Research Department) He, recently spoke to the students of the University of California on the opportunities of trained pharmacists in non pharmaceutical occupations

Anton Hogstad, chairman of National Week Committee, writes that within the next five years there will be a marked change in American Pharmacy He is convinced that the trend of pharmacy is definitely toward a revival of the professional in pharmacy He holds that many important factors should be receiving attention—professional window displays, personal contact with physicians, consideration of the advantages of an open-view prescription department a professional library and methods for promoting the professional phases The trend should be to the fundamentals of pharmacy and emphasis should be on quality and service

Walter J Hartung addressed the annual meeting of Columbia University College of Pharmacy January 16th, on Changing Styles in Modern Materia Medica"

J A Porter, Lincoln Neb, has been appointed member of the Nebraska Board of Pharmacy

Prof Alexander Tschirch, of Bern, Switzerland, celebrated his 77th birthday on October 17th Many of the prominent leaders in European pharmacy called at his home to extend congratulations This visit was arranged by Dr Ferchl of Mittenwald, who is well known on account of his famous pharmaceutical calendar which has been published for many years

Prof Tschirch was formerly head of the Pharmaceutical Institute in Bern, the new building for which was recently dedicated He is an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION

Dr Horatio N Fraser, pioneer in the tablet triturate industry, received the congratulations of the New York Veteran Druggists on his 82nd birthday, November 30th

Mrs John F Hancock and Mrs Charles E Dohme (Baltimore), widows of A PH A ex-presidents, celebrated their 93rd birthdays this month All good wishes are extended

Our fellow-member, **Vladko Bartulic,** is owner of the pharmacy in Zagreb Jugoslavia, dating back to 1599 Recently Mr Bartulic refurnished the pharmacy throughout He has photographs of nearly every owner and these with sketches are collected in a 36-page booklet, published as part of the celebration of the 333rd anniversary of the establishment

Theodore D Wetterstroem issued a publicity statement in which he stressed the importance of the pharmacist in public health service He dwelt with particular emphasis on the general adherence of pharmacists to standards

Leo G Penn, a member of the faculty of Temple University Pharmacy School was elected president of the Philadelphia Association of Retail Druggists at the annual meeting of the organization

Hugo Kantrowitz, former editor of New York *Apotheker Zeitung,* was elected *honorary president* of the New York Veteran Druggists' Association

James H Beal, E Fullerton Cook, Samuel L Hilton, E F Kelly and Samuel C Henry attended a meeting of the Board of Trustees, U S Pharmacopœia, in Washington, during the week of January 22nd They also conferred on the food and drug bills now in Congress in the consideration of which they joined by President R. L Swain, of PH A

OBITUARY

BARNETT MILLER

Barnett Miller, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died January 3rd aged 61 years, of pulmonary embolism, following an automobile accident

Mr Miller was born in Russia, September 22, 1872 He graduated from Brooklyn College of Pharmacy in 1902 won the Junior Medal in 1902, the Brundage Medal in 1903 the post graduate Gold Medal in 1906, and earned the Phar D degree

Mr Miller engaged in the drug business on his own account at 53rd St & Third Ave and was secretary of Ormant Drug & Chemical Company at the time of his death He was financial secretary of New York Retail Druggists' Association for about 14 years, served as treasurer for 2 years and for one year as its president He was a member of New York Pharmaceutical Association, New York Apothecaries' Association, Drug and Chemical Square Club and held important offices in other drug and pharmaceutical organizations

Mr Miller was a member of the Masonic bodies, under whose auspices the funeral services were held

The deceased is survived by his wife a son and a daughter

H W Eddy, Attorney, in fact for the Casualty Indemnity Exchange and the Druggists' Indemnity Exchange, St Louis died January 6th

OTTO WIDMANN

Otto Widmann, outstanding Missouri ornithologist, died at his home in St Louis, November 26th, aged 92 years He was the son of a German naturalist and came to the United States as a young man, he engaged as a drug clerk and later, for many years was proprietor of a St Louis pharmacy For about sixty years he carried on the studies which have made him known throughout the world, his writings became textbooks and many naturalists followed in his footsteps It is said he knew birds as few persons know them, he was the first student, in his section, to welcome the return of his feathered friends and the last to bid them goodby He retired from the drug business about 30 years ago, so that he could devote all of his time to studies

L C BRENNER

Just before closing forms for the January JOURNAL we are advised by Walter D Adams of the death of L C Brenner of Gonzales Tex, president of Texas Pharmaceutical Association, 1932–1933 Further notice will be made in the February JOURNAL

DR KEIZO IKEGUCHI

Dr Keizo Ikeguchi died at his home on December 1st He was a member of the Commission on Japanese Pharmacopœia, president of the Japanese Hygienic Chemical Society and president of Tokyo College of Pharmacy He was a graduate of Tokyo Imperial University and associated with every movement for the advancement of pharmacy in Japan

LEGAL AND LEGISLATIVE

WHERE IS THE FINAL RESPONSIBILITY FOR THE EFFICIENT ADMINISTRATION OF CODES?

Frank S Pollak, Counsel, states that the final responsibility rests with NRA A code, when once approved by the President, becomes a law of the United States, and it is the duty of the Government to see that it is carried out NRA will therefore supervise code administration by code authorities but it is the aim of NRA to help industry develop its own agencies of self government and to give to the Code Authority in each industry as much responsibility as it is able to take in the administration of its code

AN EXECUTIVE ORDER SEEKS TO PROTECT THE SMALL DEALER

President Roosevelt has issued an executive order intended to protect the small business man against monopolies in conforming with the requirements of the codes under the national recovery act To eliminate discrimination against small enterprises, the President's order makes it possible for complainants operating under the codes to go before the Federal Trade Commission or to the Department of Justice for redress

Under such a method grievances can be adequately aired and settled by disinterested governmental agencies in accordance with the

principles set forth in the recovery legislation According to the President's order, the Federal Trade Commission, in handling such complaints, will follow the procedure set forth in its organic act In the event the nature of the complaint is such as to be beyond the jurisdiction of the Federal Trade Commission, the President's order makes it possible for the complainant to take his grievance to the Justice Department

DRUG CONFERENCE BILL IN SENATE

The National Drug Trade Conference Bill to amend the present food and drugs act was introduced in the senate by Senator H D Stephens of Mississippi

The bill is the same as that introduced in the house by Representative Loring Black It bears the number S 2355, and was introduced by the Senator 'by request" Senator Stephens is chairman of the Senate Committee on Commerce, which also has before it the revised Tugwell food and drug bill sponsored by Senator Royal S Copeland of New York

The special committee of the conference, appointed at the last annual meeting to promote reasonable revision of the food and drugs act, met in Washington January 24th, to discuss the various bills offered for such revision

LEGALITY OF RETAIL AUCTIONING OF DRUGS QUESTIONED

Assistant Attorney General G C A Anderson holds that retail auctioning of drugs and drug preparations cannot be held outside of a pharmacy under the pharmacy and drug laws of Maryland In his opinion

The pharmacy and drug laws of this state contain various provisions regulating pharmacies, many of which are for the protection of the public against indiscriminate sale of poisonous drugs or harmful medicines None of these provisions is complied with or even remotely fulfilled in a sale of this character

'Therefore, it is my opinion that the auction sale of drugs, as outlined, cannot be held under the pharmacy and drug laws of this state"

BOOK NOTICES AND REVIEWS

Illustrierter Apotheker Kalender 1934—Illustrierter Apotheker Kalender 1934, prepared by DR FRITZ FERCHL, Mittenwald, Germany, price 75¢

This annual publication is always welcome This issue is the ninth, and is full of historical material, beautifully illustrated Quite a number of drug jars of various periods are shown, on one page prescriptions of the father of the poet Schiller are reproduced Quite a number of old apothecary shops are among the illustrations, and apparatus of the eighteenth century Then follow pictures of pharmacies in which the religious thought enters There are also quite a number of mortars of various periods A picture of the old E Merck pharmacy—The Engel Apotheke Throughout the Kalender will be found much interesting historical information Those who have had an earlier copy of this Kalender will no doubt desire the one for 1934

The Medicinal and Poisonous Plants of Southern Africa By JOHN MITCHELL WATT, M B , Ch B , professor of Pharmacology in the University of Witwaterstrand, Johannesburg and MARIA GERDINA BREYER AND BRANDWIJK, formerly lecturer in Pharmacology and research worker in Phytochemistry in the Department of Pharmacology, University of Witwaterstrand, Johannesburg Published by Wm Wood & Co , Baltimore This volume of more than three hundred pages contains twelve illustrations in color and twenty in black and white It gives an account of the medicinal uses, chemical composition, pharmacological effects and toxicology in man and animals of the medicinal and poisonous plants of Southern Africa One hundred twenty-eight plant families are represented and many of them are described at length and others briefly The aim has been to give all the available information on the medicinal uses, chemical composition, pharmacological effects, and human and veterinary toxicology of the flora of Southern Africa The book forms a useful basis for new work and its publication may prevent overlapping and repetition by other workers in this field The authors hope that the medical practitioner, the pharmacist, the missionary the forensic workers and the scientist will find it of value in their several spheres

The indices give botanical names of the plants common names from European lan-

guages, native names and active principles, obsolete names have also been recorded The authors have given the results of research relating to the plants, they are deeply indebted to the station of the Division of Plant Industry at Pretoria for determining the plant specimens which number over twenty-five hundred

Allan's Commercial Organic Analysis, Volume X, published by P Blakiston Son & Co , Inc , Philadelphia, Pa

Preceding volumes of this valuable publication have been reviewed in the JOURNAL and all of the commendatory references made heretofore apply to this volume It is well bound and printed and covers more than 800 pages

Volume X is devoted to Haemoglobin and Its Derivatives, Albuminoids or Scleroproteins, Structural Proteins, Examination of Foodstuffs for Vitamins, the Hormones, the Identification of Unknown Woods and Charcoals, the Pectic Substances

The Editor is C Ainsworth Mitchell of the *Analyst*, consulting chemist of London and other contributors are J Addyman Gardner G A Buckmaster, J Alexander, W P Dreaper R H Marriott J C Drummond, Katherine Coward, K Culhane S W F Underhill, J C Maby H W Buston and M B Elliott This volume completes the fifth edition of "Allan's Commercial Organic Analysis," and as the Editor states, the subjects treated have become more miscellaneous in character than the preceding editions It is hardly possible for a chemist to carry on his researches without this work and this applies also to those doing research in pharmacy This volume contains the *general index* As stated, this publication is so generally and favorably known that it is unnecessary to extend this notice

Spezialitäten Taxe, published by the German Apothecaries Society This comprehensive index of more than twelve hundred pages lists all medicinal preparations in the various forms represented on the market, proprietary preparations, officials, etc Those coming under specific legislation, as narcotics are designated, also, the purposes for which they are used and the industry or profession employing them In other words, the information given is of value to all pharmacists, druggists manufacturers and dealers

It is a German publication but can readily be used as reference by all engaged anywhere in the drug industry The tabulation gives the information required on all preparations, as far as purchase and selling prices are concerned The first column notes whether the product comes under specific legislation, the next column gives the wholesale price followed by the name of the preparation, form and other descriptive matter The next column describes the package, then follows the selling price without tax or duty and then the selling price with tax or duty Several columns enable the user to make additional references

This is the fifteenth edition of the book which speaks for the usefulness of the publication in so far as its purpose is concerned the publication deserves commendation The price is R M 20 00

FEDERAL FOOD, DRUG AND COSMETIC ACT

Representatives of the National Drug Trade Conference held meetings during the week of January 22nd, and in conference with Charles Wesley Dunn framed a new bill which corrects the defects and undesirable features of other bills in Congress Representatives of the food and cosmetic industries have signified their approval and willingness to back the measure and it is hoped that Senators Copeland and Stephens, and Representative Loring Black will find the measure acceptable, so that there may be unison in the promotion of the new bill

The object of the bill is stated to be for the purpose of preventing adulteration, misbranding and false advertising of food, drugs and cosmetics, in the commerce affected, for the following purposes, namely, to safeguard the public health and to protect the purchasing from injurious deception The suggested title of the bill is given as "Federal Food Drug and Drug and Cosmetic Act "

WINNER OF THE NATIONAL PHARMACY WEEK CONTEST

We are in receipt of a *Bulletin* of the National Pharmacy Week Executive Committee Anton Hogstad, Jr , *Chairman*, through which we are advised that O U Sisson well and favorably known Chicago pharmacist, has been awarded first place in the 1933 National Pharmacy Week Window Display Contest Honorable mention is made by the Committee of C Thurston Gilbert Noroton Heights, Conn , S M Leoncavallo Wilmington, Del , H Dratzka, South Milwaukee, Wis , Emerichs Pharmacy, Orlando, Fla

PHARMACY AND THE DRUG STORE

This is no time to criticize, unless the purpose is to be helpful to cooperate in improving conditions that exist, to establish confidence

A disturbing factor starts most of us to thinking, it is unnecessary to be reminded of how conditions developed that cause us to realize what our standing is and be convinced that we have not been as earnest as we should have in persistently striving to attain the opportunity that is always beckoning to us from the horizon of the future Fifty years ago, William S Thompson, of Washington, D C, then president of the AMERICAN PHARMACEUTICAL ASSOCIATION, said in his presidential address "Are we not justified in the belief that from the present trade conflict there will survive a higher pharmacy than that of our time? We are sustained in this opinion by a survey of the entire situation of pharmacy in this country characteristic of our country in all that pertains to science and art—our profession will not lag behind, but the followers fully equipped with knowledge and skill, will stand shoulder to shoulder with the most advanced, and with equal strides will move on to that brighter era for which they appear to be preparing"

The representative of the U S Public Health Service at the Diamond Anniversary Meeting of the A PH A said that "the thing which challenged his admiration more than anything else was the evident broadening scope of the organization—the broad statesmanship displayed in the laudable effort to bring together many divergent interests which have, however, one objective in common—the advancement of pharmacy"

The closing paragraph of an editorial in the *Australasian Journal of Pharmacy* seems applicable and is quoted "The call in pharmacy to-day is the will to adopt a plan and to stick to it until it is brought to a final and successful conclusion There is much that cannot be done—there are forces that cannot be overcome by direct attack—but by means of flank attacks and concerted action by the whole body along definite lines the way can be paved to brighter and better things The heritage of pharmacy lies in the traditions of the past Its future depends on those who are practising its profession to-day Great responsibility is cast on those who are leading in the van, but equally so is the need on the part of all of the true cooperative spirit that is willing to sacrifice to some extent its individuality in order to gain a greater success for the good of all"

We are not merely passive observers of a stupendous national drama, and our destiny is dependent on our resourcefulness and our character A result for the good of the public should come out of this adjustment in restricting the sale and dispensing of medicines to those qualified by education and training Times like the present bring to the fore a realization of conditions which have not heretofore been disturbing factors and it is to be hoped that the public will gain a clearer appreciation of the fundamentally important rôle of pharmacy for its protection

In proper shaping of affairs the thought must lead that success depends on unison in action as far as this is reasonably possible, and confidence within the groups is essential, strengthened by a right understanding with related activities

DR ROBERT P FISCHELIS

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII FEBRUARY 1934 No 2

ROBERT PHILIP FISCHELIS

Robert P Fischelis, president-elect of the AMERICAN PHARMACEUTICAL ASSOCIATION, son of Philip and Ernestine (Kempt) Fischelis, was born in Philadelphia, Pa , August 16, 1891 He received his early education in St Paul's Lutheran Parochial School, Philadelphia, and the public schools of that city, graduating from the Northeast High School in 1908 The same year he engaged with James Huston, prescription pharmacist, Philadelphia The following year he entered the Pharmacy School of the Medico-Chirurgical College of Philadelphia, graduating at the head of his class in 1911 Among the five medals and prizes he received was a year's membership in the AMERICAN PHARMACEUTICAL ASSOCIATION, offered by Prof George R Meeker for the highest mark in analytical chemistry He immediately joined the ASSOCIATION and has been a member ever since Dr Fischelis continued his studies in the Department of Pharmaceutical Chemistry of the Medico-Chirurgical College and in the College of Liberal Arts and Sciences of Temple University, receiving the Ph C degree from the former and the B Sc in Chemistry from the latter

In 1912, he began teaching Pharmacy and Organic Chemistry in the Department of Pharmacy of the Medico-Chirurgical College, and also taught Pharmacy in the Department of Medicine During this period he took up graduate work and, later, received the Doctorate in Pharmacy from the Medico-Chirurgical College In addition to his education in Pharmacy and Chemistry, Dr Fischelis also took courses in Bacteriology at the University of Pennsylvania Summer School, and courses in Economics at the Wharton School of Commerce and Finance of the University of Pennsylvania After the Pharmacy School of the Medico-Chirurgical College merged with the Philadelphia College of Pharmacy and Science, the degree of Master of Pharmacy (in course) was conferred upon him

In 1914, Dr Fischelis became associate editor of the *Druggists Circular*, which was then under the editorial guidance of Dr H V Arny While holding this position he continued teaching on a part-time schedule in Philadelphia He left

the *Druggists Circular* in 1916 to join the Scientific Staff of the H K Mulford Company in Philadelphia, continuing part-time teaching at the Medico-Chirurgical College and, later, at the Philadelphia College of Pharmacy and Science

He left the Mulford Company to join the Chemical Warfare Service, U S A, during the War Upon leaving the army, he opened his own office in New York City as a consulting pharmacist and chemist He also joined the editorial staff of *Industrial and Engineering Chemistry* under Dr C H Herty and, later, became managing editor of the *News Edition* of that publication He relinquished this post in 1928 because of pressure of other duties

From 1921 to 1925, Dr Fischelis was dean and professor of Pharmacy at the New Jersey College of Pharmacy in Newark, New Jersey During his incumbency, this institution grew from a student body of approximately fifty to one of about two hundred and fifty Official recognition was granted the college during this period in the states of New Jersey and New York, Pennsylvania and others and it also obtained membership in the American Association of Colleges of Pharmacy He was instrumental in beginning negotiations for the affiliation of the college with Rutgers University and conducted a campaign for funds among its alumni and friends for a new building He was elected vice-president of the American Association of Colleges of Pharmacy in 1924 He resigned as dean of the New Jersey College of Pharmacy in 1925, spent several months recovering from a breakdown in health and then resumed his consulting practice and continued his editorial activities At this time he also became educational advisor to the Board of Pharmacy of the state of New Jersey In 1926, he was offered and accepted the secretaryship of the Board of Pharmacy of the state of New Jersey, upon the demise of the late Prof Jeannot Hostmann, he was also made chief chemist of the Board, and has held these positions since 1926, making his headquarters in Trenton

The president-elect has been active in association work for many years From 1913 to 1915, he was secretary of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION In 1916, he was secretary of the Section on Commercial Interests, A PH A, and the following year he served as chairman of this section From 1923 to 1925, he served as secretary of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION and chairman of the Committee on Publications From 1931 to 1933, he was president of the New York Branch, A PH A, was elected first vice-president of the parent ASSOCIATION in 1933 and is now serving in that capacity

Both the Pennsylvania and the New Jersey Pharmaceutical Associations have been served by Dr Fischelis in an executive capacity From 1916 to 1919 he was secretary of the Pennsylvania Pharmaceutical Association, and in 1919 he became its president He founded and edited the *Pennsylvania Pharmacist* while secretary of the Association In 1926, when the late Professor Hostmann, secretary of the New Jersey Pharmaceutical Association, passed away, Dr Fischelis was asked to accept the secretaryship for the unexpired term and was persuaded to continue in that office until 1929, when he resigned because of pressure of his official duties and new work undertaken for the Committee on the Costs of Medical Care While secretary of the New Jersey Pharmaceutical Association, he founded and edited the *New Jersey Journal of Pharmacy* He also served this Association as second vice-president in 1923–1924 and as first vice-president in 1924–1925 At present he is a member of the Board of Trustees of the Association and chairman of several

of its committees Since 1931, he has been vice-president and chairman of District No 2 of the National Association of Boards of Pharmacy From 1920 to 1932 he was editor of the news service of the Drug Trade Bureau of Public Information He has edited the Charter's Report, published under the title "Basic Material for a Pharmaceutical Curriculum"

Dr Fischelis is a member of the American Chemical Society, the American Public Health Association, the American Medical Association, the Chemists' Club of New York, the Rotary Club of Trenton and a fellow of the American Association for the Advancement of Science He was a delegate to the U S P Revision Conventions of 1920 and 1930, and is a member of the A PH A Recipe Book Committee

He is a member of the Kappa Psi fraternity, the Beta Phi Sigma, Phi Lambda Upsilon, honorary Chemical Society, and a member of the American Legion He is a former president of the Alumni Association, Department of Pharmacy, Medico-Chirurgical College and of the Alumni Association of the Philadelphia College of Pharmacy and Science

Since 1926, he has been a cooperating state official of the U S Food and Drug Administration, and he has also taken an active part in the Conference of Pharmaceutical Law Enforcement Officials He gives an annual series of lectures on pharmaceutical journalism and on patents and trade-marks at The Philadelphia College of Pharmacy and Science

As a member of the Research Staff of the Committee on the Costs of Medical Care, Dr Fischelis, in cooperation with Dr C Rufus Rorem, made a survey of the manufacture and distribution of drugs and medicines in the United States and the services of pharmacy in medical care The results of this survey have been published by the University of Chicago Press in book form under the title "The Costs of Medicines" He is a frequent contributor to various pharmaceutical and chemical publications, and is the author of the chapter entitled "Medical Materials Industry" found in Volume X of the Encyclopedia of the Social Sciences Section III of the National Pharmaceutical Syllabus, dealing with State Board examinations, was written by Dr Fischelis, who was also chairman of the sub-committee on cultural and basic subjects of the Syllabus Committee

In 1933, he was appointed a member of the Governor's School Survey Commission which has been engaged in studying the educational program of the state of New Jersey

In 1919, Dr Fischelis married Miss Juanita C Deer of Chicago

Hygiene Exposition Held in Lima—The President of the Republic inaugurated on December 10th for 15 days the First International Hygiene Exposition held in this city under the auspices of the Bureau of Health, Ministry of Fomento (Commercial Attache Julian D Smith, Lima)

Druggists' Exhibit at the Leipzig Sample Fall Fair 1933 Proves Great Attraction—The official figures of the Leipzig sample fall fair of 1933 included also the exhibitors at the "Brown Fair" held on the Fair Grounds where the Association of Leipzig Druggists maintained a collective exhibition for advertising and propaganda purposes While this special exhibit of Leipzig druggists proved a great attraction for the local visitors and those from neighboring cities, its effect on the wholesale and export business was slight (Vice Consul P Mallon Leipzig)

EDITORIAL

E G EBERLE EDITOR 2215 Constitution Ave , WASHINGTON D C

THE PHARMACY EXHIBIT—A CENTURY OF PROGRESS INTERNATIONAL EXPOSITION

THE 1933 Pharmacy Exhibit of the World's Fair will very likely be continued this year, Medicine and Dentistry have decided on doing so Illustrations of the Pharmacy Exhibit are shown in the January (1933) number of the JOURNAL, pages 1 and 4 and in the July issue, pages 592 and 594, and comments appear in the same numbers and also elsewhere in other issues of the year The Committee on Pharmacy Exhibit consisting of H C Christensen, *Chairman*, J H Riemenschneider, *Treasurer*, and Frank B Kirby, *Secretary*, has issued a general letter to the press acknowledging contributions and thanking the contributors and cooperators for their financial help and valuable services, including manufacturers and wholesalers, associations, publications, retailers and individuals

The following is quoted from the letter of appreciation in which the names of the donors are given

> Invaluable aid in planning and building the exhibit material was rendered by sub committees the chairmen of which were as follows Educational C B Jordan Historical, Edward Kremers United States Pharmacopœia E Fullerton Cook Legislation R L Swain Service in Public Health E F Kelly Professional C Leonard O Connell
>
> Special mention for valuable assistance in installation work personnel etc , is also due to R W Terry and E N Gathercoal of the University of Illinois Edward Ireland of the University of Wisconsin H W Heine and C J Zufall, of Purdue University also O U Sisson of Chicago
>
> The Committee is indebted to the pharmaceutical press of the country for the splendid publicity given to the exhibit, to the Century of Progress officials for the donation of the space including electricity, this being the biggest debt as the space had a commerical value of approximately $15 000 to Mrs Lillian H Bowen for handling the correspondence and clerical details of the exhibit to Thaddeus Niemic who had charge of the professional demonstrations and to Miss Esther H Barney Superintendent of the Exhibit goes a large share of the credit for the day to day success of the exhibit in impressing the thousands of visitors both professional and laymen with the importance of pharmacy and pharmaceutical service in the field of public health "

We would repeat what was said in a number of the issues of the JOURNAL regarding the exhibit and express appreciation for the outstanding work of the committee, American pharmacy is indebted to the members for the services rendered by them Acknowledgment was made by resolution at the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in Madison, and further expressions of appreciation by individuals, affiliated bodies and other organizations evidenced the importance of the exhibit

While the value of the Exhibit is recognized as a pronounced success the committee feels that a number of improvements can be made and invites suggestions for carrying on the exhibit this year Further comments will be made in succeeding numbers of the JOURNAL with the purpose of giving the members of the committee every possible assistance Pharmacy was given equal recognition with related professions in the Medical Section The exhibit provided a valuable contact with the public and a publicity which greatly benefits pharmacy

PAN-AMERICAN MEDICAL ASSOCIATION

LAST year pharmacists were invited to participate in the program of the pharmacopœial section of the Pan-American Medical Association meeting in Dallas Theodore J Bradley presided over the sessions, at which time many papers bearing on pharmacopœial work were read and the possibilities of "Pan-American Pharmacopœial Uniformity" were presented in a paper by E Fullerton Cook, printed in the May JOURNAL for 1933, page 456

Pharmacists are again invited to participate in the program In the paper referred to it was pointed out that "the establishment of a Section on Pharmacopœias as a regular function of the organization opens a new line of interest and service in Pan-American cooperation which is most gratifying The idea of a Pan-American Pharmacopœia and in fact the effort to develop an 'International Pharmacopœia' is not new, but every earlier effort failed because such an idea is not in conformity with the spirit of strong nationalism which exists in every country We may well benefit from the experience of the international groups who made their first progress by agreeing upon a policy which did not interfere with the continuance of their own national Pharmacopœia but, in principle, obtained practically all of the benefits of an 'International Pharmacopœia' "

This year's conference will be held on the S S Pennsylvania A program has been outlined for the floating Congress to Venezuela, March 14th–30th

Many of the papers will be read during a four-day session at sea, but there will be a session in Venezuela also The physicians will visit Colon, Cartagena, Puerto Cabello, Caracas, La Guayra and San Juan, P R In Venezuela the members of the party will be entertained at Maracay, the home of President Gomez The party will then go to Caracas, returning by way of San Juan the members will be guests of the Governor of Puerto Rico, Dr Morales Otero, president of the Medical Association in Puerto Rico, and Dr George Bachman, director of the School of Tropical Medicine, Columbia University of Puerto Rico

---

HISTORICAL PHARMACIES

THE following resolution was adopted at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION

Resolved that the Local Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION, State Pharmaceutical Associations Boards and Colleges of Pharmacy as well as other organizations and individuals interested in the progress and development of pharmacy be urged to supply documents of historical interest, relics and museum material to the museum and library of the Headquarters Building of the AMERICAN PHARMACEUTICAL ASSOCIATION at Washington and be it further

Resolved, that organizations and individuals interested in the progress of pharmacy be urged to prepare papers on matters of historical interest for presentation to the Section on Historical Pharmacy of the AMERICAN PHARMACEUTICAL ASSOCIATION

The purpose of this comment is to bring to the attention of pharmacists the possibilities of preserving historical pharmacies in various localities This was brought to mind by a brief history of Apothecaries Hall, New Haven, Conn, published in connection with the celebration of the 150th anniversary of the New

Haven County Medical Society (1934) and the 113th anniversary of Apothecaries Hall The history of the latter was prepared by the son of Emil A Gessner,[1] long a member of the AMERICAN PHARMACEUTICAL ASSOCIATION and, until his demise, February 3, 1930, proprietor of Apothecaries Hall

A replica of Philo Carpenter's drug store, Chicago, is part of the Pharmacy Exhibit—A Century of Progress—a sketch by William B Day is printed in the September JOURNAL for 1931, pages 922-924 A sketch of General Mercer and his apothecary shop appears in the June number of the JOURNAL for 1926, page 425 The list of pharmacies which have been depicted can be extended, but the purpose is to awaken an interest to preserve historical pharmacies or place plates on the buildings that housed them, which will acquaint the citizens and visitors with related historical data

Recently, the Leadbeater Pharmacy has been purchased for the AMERICAN PHARMACEUTICAL ASSOCIATION It is the intention of the Association for the Preservation of Alexandria Antiquities to restore the interior and open the building as a museum During a recent visit the doors that belonged to the pharmacy in its earliest days were found in the attic Its restoration will make it possible to visit where Washington had his medicines prepared by Edward Stabler, the founder of "Leadbeater Pharmacy"

The Headquarters Building is now prepared to receive historical material for its museum—an historical description should accompany the contribution

CENSUS OF THE DRUG INDUSTRY AND PHARMACY

THE Bureau of Census for the calendar year 1933 is in preparation and the Department is urging all activities to reply promptly in giving the information requested in the circular The importance for doing so is in the fact that the data will be helpful in presenting conditions in the industry on which action may be taken on questions that concern druggists and pharmacists Without such information misunderstandings are bound to occur, without the possibility of presenting necessary details Arguments in attempting to arrive at conclusions regarding the code have shown that officials are not always informed on questions applying to the drug store that are very different from those in other activities

No similar census has been undertaken since 1929 and the Bureau is asking that druggists render complete reports promptly When the reports have been received separate compilations are to be made covering the different divisions of the drug industry This comment is prompted by the belief that this census is of greater importance than those immediately preceding

Cod Liver Oil Steaming Plants in Norway—There are approximately 800 steaming plants in Norway, according to an estimate furnished by the Bureau of Fisheries The total number of producers of raw cod liver oil is unknown, but exporters estimate the total to be around 500 who produce from 2 to 20 barrels each The number of such producers has been decreasing from year to year as fast as new steaming plants have been opened in the various districts (Office of the Consulate Bergen)

[1] See November JOURNAL 1928, page 1071

SCIENTIFIC SECTION

ANTIDOTES III THALLIUM *

BY JAMES C MUNCH, CONSULTING PHARMACOLOGIST, BUREAU OF BIOLOGICAL SURVEY, GLENOLDEN, PA

In 1924 laboratory investigations suggested the value of thallium in the control of various rodents Field tests conducted in the next few years validated our laboratory conclusions (19, 21) Literature did not reveal any definite information regarding antidotes for thallium poisoning, so studies along this line were undertaken These experiments were conducted in the Washington laboratory of the Bureau of Chemistry (now called the Food and Drug Administration) of the United States Department of Agriculture at an elevation of about one hundred feet above sea-level Thallium sulphate solutions were included in the diet, or injected subcutaneously or intravenously into dogs Less extensive studies were made on rabbits, rats, guinea-pigs and cats Dogs used in this work were fed 100 Gm of ground lean meat containing five per cent of dried whole milk powder daily Bones were included in the diet once a week Drinking water was available at all times No evidence of dietary disease was noted among the control animals The development of thallotoxicosis was followed daily and definite symptoms were recognized as characteristic of thallium poisoning (9, 16, 18, 20) In some experiments the protective procedure was commenced at the time poison was administered In other experiments treatment was delayed Chemical studies of thallium elimination under various methods of treatment were contemplated, but were not carried out in detail then because of the lack of suitable analytical methods With the development of quantitative methods, chemical essays are used to control the efficiency of various procedures

TABLE I—CERTAIN LETHAL DOSE OF THALLIUM—MG TL PER KG

Animals	Method of Administration			
	Oral	Subcutaneous	Intraperitoneal	Intravenous
Frogs		2 5–60 (?)		
		150 (3)		
Birds	35–50	40–160		
Mice	25 (5)	70 (2)	70 (2)	
			30 (4)	
Rats	25 (5)	60 (2)	60 (1)	
			40 (2)	20–25
Guinea pigs		70 (2)	70 (1)	
		10 (5)	10 (5)	25
Rabbits	500	20–60		25 (1)
Hedgehogs		36		
Cats	250–500	15		
Dogs	15–100	15–45	13	20–25

Foot note The figures in parentheses represent the day's interval between injection and death

The intravenous administration of 25 mg of thallium per kilo (in the form of thallium sulphate) was followed by death within five to ten days, and this was

* Scientific Section, A PH A, Madison meeting, 1933

selected as the certain lethal dose (L D 100) Smaller doses occasionally killed, although the percentage of recoveries increased as the dose decreased Twenty-five mg of thallium per kilo fed to rats or intravenously injected in the marginal ear vein of rabbits produced death within three to five days (21) Available results upon toxicity to various animals are given in Table I

Based on a knowledge of the chemical behavior and toxicity of thallium compounds, various drugs were administered in attempts to counteract the poisonous effects

(1) *Sodium thiosulphate* had been considered as an antidote in the treatment of heavy metal poisoning, although in 1924 no references to its use in thallotoxicosis were found Our original tests failed to show definite relief following its use Oral administration had very little effect Intravenous injections often increased the severity of thallium symptoms within twenty-four hours The following year Buschke and Peiser (5, 7, 8) published their study on this question and reached the same conclusion

(2) The insolubility of the *halides* of thallium led to the study of the possibility of protecting animals by a course of treatment with the chloride or iodide of sodium or potassium The potassium salts were useful but caused cardiac depression Administration of sodium chloride was somewhat less effective than sodium iodide The elimination of thallium was followed by flame tests on twenty-four hour urine samples to determine the relative intensity of green color Treatment with sodium iodide decreased, and treatment with sodium thiosulphate increased the thallium excretion in the urine

(3) One outstanding feature of thallium poisoning is the general endocrinological depression Various endocrine stimulants were considered and finally *pilocarpine* was adopted because of its low toxicity in effective doses Not only does pilocarpine serve as an endocrine stimulant, but also it stimulates perspiration As thallium is eliminated in the sweat, this was believed to reduce the strain on the kidneys

(4) Thallium poisoning produces hypo- or achlorhydria (13, 14, 15, 21) Therefore, *hydrochloric acid* was given by mouth to dogs with some success, as an adjunct to other methods of treatment

(5) Marked disturbances of *calcium* metabolism have been observed in thallotoxicosis Our studies did not indicate any particular benefit following the administration of calcium salts alone, but in conjunction with iodide-thiosulphate treatment appeared to favor more rapid recovery

(6) Subsequent reports of studies on treatment suggested and denied the value of various *glandular extracts*, more particularly thymus, parathyroid and pituitary gland extracts (1, 2, 3, 6, 8, 9, 10, 11, 14, 15, 17, 21, 22, 23, 24) No laboratory studies were made with glandular extracts in the 1924 investigations The incorporation of various glandular extracts in the treatment of thallium poisoning to dogs in later studies did not appear to be successful

Based on results obtained in the 1924 animal experiments, it was felt that thallium poisoning would be combated most successfully by (*a*) intravenous administration of sodium iodide until thallium had practically disappeared from the twenty-four hour urine, (*b*) sodium thiosulphate intravenously to induce gradual elimination of thallium, (*c*) pilocarpine and calcium salts intravenously, and (*d*)

oral administration of hydrochloric acid This regime based solely upon tests on animals may be inadequate, since there is always a question regarding the efficacy of an antidote *for* humans, unless it is firmly established by experiments *upon* humans Recognized methods of treating strychnine or arsenic poisoning which were developed upon animals have shown somewhat disappointing results when employed upon man, and vice versa The need for extreme caution in advocating any specific course of treatment as "a successful antidote" for any poison is appreciated For this reason this regime was not included in the 1931 report (21) in which reference was made to the use of iodides or chlorides and to sodium thiosulphate intravenously

What results have been obtained in treating human thallotoxicosis? Thallium is commonly, or at least frequently used in medicine Of 8006 children who received thallium acetate as a depilatory, 447 were poisoned and 8 died A number of reports of clinical, cosmetic, rodenticidal and suicidal thallium poisoning have been collected

The extensive survey by Buschke and Peiser (9) contains several reports of attempts to counteract human thallotoxicosis Bogdanov and Lasko (4) relieved pains in the extremities in two cases of thallium poisoning by sodium thiosulphate, Mrongowius and Duchan (18) in 1928, and Caluzzi (12) in 1929, observed a decrease in toxicity of thallium salts to older children by administration of 1 to 1 5 Gm of sodium thiosulphate three times daily Subsequent administration of sodium thiosulphate accelerated recovery following clinical use of thallium For the treatment of thallotoxicosis Mrongowius and Duchan (18) recommended a combination of 5 Gm of sodium thiosulphate and 5 mg of pilocarpine nitrate in 20 cc of distilled water It is of interest, in this connection, that Buschke, Duchan and Joseph (7) were unable to obtain any benefit by using this treatment upon thallium-poisoned animals

Over thirty-one persons were poisoned by thallium in January 1932, near Fresno, California (16, 20), at an elevation of two hundred feet above sea-level Fourteen were hospitalized, one being less seriously poisoned than the others Eight patients who were treated by this regime recovered Six others who were treated with sodium thiosulphate, dextrose and parathyroid extract died It is not certain that these eight patients would have died if this regime had not been followed, however, in the opinion of the attending physicians their clinical condition was as serious as the condition of those who died

CONCLUSIONS

1 Experiments upon animals in 1924 led to the development of a definite method for combating thallotoxicosis treatment with sodium iodide, sodium thiosulphate, pilocarpine, calcium salts and hydrochloric acid

2 This regime was successful in treating eight humans poisoned by thallium, six untreated patients died

BIBLIOGRAPHY

(1) Y Aramaki Studien über die Alopecien, *Japan J Dermatol and Urol*, 24 (1924), 79–81

(2) K Berde, Über die Beeinflussung der Thalliumepilation durch Hormone bei Ratten *Dermatol Wochschr*, 86 (1928) 793–798

(3) L Bickel and A Buschke, Thallium and Hypophysen-vorderlappen, ihre gegen seitige Beeinflussung bei der weissen Maus, *Klin Wochschr*, 11 (1932), 679–682

(4) S Bogdanov and N Laslo, Zur Thalliumbehandlung der Pilzerkrankung und zur Behandlung von Thalliumzwischenfällen mit Natrium Thiosulfat *Wratschebnoje Delo*, 11 (4), (1928), 304–306

(5) A Buschke, Uber experimentelle und klinische Versuche zur Entgiftung des Thalliums durch Natriumthiosulfat, *Dermatol Wochschr*, 87 (1928), 1833–1834

(6) A Buschke, Thallium und Thymus, *Klin Wochschr*, 12 (1933), 311

(7) A Buschke, G Duchan and A Joseph, Uber die Anwendung des Natriumthio sulfates zur Verhutung der Komplikationen bei der Thalliumtherapie *Dermatol Wochschr* 87 (1928) 1835–1837

(8) A Buschke and E Langer Über die Beeinflussung der Thalliumwirkung durch Hormone *Ibid*, 87 II (1928), 1115–1117

(9) A Buschke and B Peiser, Weitere experimentelle Ergebnisse über endokrine Störun gen durch Thallium *Klin Wochschr* 1 (44), (1922), 2182–2184

(10) A Busche and B Peiser, Die biologischen Wirkungen und die praktische Bedeutung des Thalliums *Ergeb Allg Path u Anat*, 25 (1931) 1–57

(11) A Buschke and J Vasarhelyi, Wirkung des ultravioletten Lichts auf die Thallium alopecie, *Klin Wochschr*, 40 (1932), 1678

(12) N Caluzzi, Il tiosulfato di sodio quale antidoto del tallio nelle cure epilatorie *Il Dermosifilogr*, 4 (1929) 399–402

(13) G B Dowling Twenty four cases of ringworm of the scalp treated by thallium epilation *Lancet* 212 (1927), 389–390

(14) G B Dowling, Treatment of Tinea Capitas with thallium acetate, *Lancet* 11 (1927), 552–553

(15) P Flamm Variozione della formula leucocitaria nei bambini tignosi e tricofitici trattati con acetato di tallio Azionde del tallio sulle ghiandole endocrine, *Biochim terap sper* 13 (1926) 27–32

(16) H M Ginsburg and C E Nixon, Thallium Poisoning, *J A M A*, 98 (1932) 1076–1077

(17) L Kaps, Kriminelle todliche suba jute Thalliumvergiftung *Wiener klin Woch schr* 40 (1927), 967–970

(18) Ju Mrongowius and G Duchan Zur Frage der Vermeidung der Komplikationen bei der Thalliumtherapie *Dermatol Wochschr*, 87 (II) (1928), 1834–1835

(19) J C Munch The Toxicity of Thallium Sulphate, Jour A Ph A, 17 (1928), 1086–1093

(20) J C Munch H M Ginsburg and C E Nixon The 1932 Thallotoxicosis Out break in California, *J A M A* 100 (1933), 1315–1319

(21) J C Munch and J Silver, The Pharmacology of Thallium and Its Use in Rodent Control, *Technical Bulletin*, No 238 U S Dept of Agri (April 1931)

(22) G Truffi The Biological Action of Thallium Acetate, *Boll sci ital biol sper* 3 (1928), 433–434

(23) J Vasarhelyi Ist die Wirkung des Thalliums mit innersekretorischen Drüsen zu Beeinflussen, *Orv Hetil (ung)*, II (1929) 1031–1032

(24) J Vasarhelyi Zur Frage der Beeinflussbarkeit der Thalliumwirkung durch Ex trackte endokriner Drusen mit besonderer Berucksichtigung der Thymus, *Dermat Z*, 56 (1929) 412–414

CERTAIN POISONOUS PLANTS OF WYOMING ACTIVATED BY SELENIUM AND THEIR ASSOCIATION WITH RESPECT TO SOIL TYPES

BY O A BEATH, J H DRAIZE, H F EPPSON, C S GILBERT AND O C MCCREARY

In 1917, the senior author published a brief treatise[1] on the poisonous properties of the two-grooved milk vetch (*Astragalus bisulcatus*) The toxic principles

[1] Wyoming Experiment Station Bulletin 112

were reported to be soluble in water and not found to be precipitated by basic acetate of lead Studies and observations made since that time led to the publication of an experiment station bulletin[1] in May 1932, on "Three Poisonous Vetches," by Beath, Draize and Eppson The authors pointed out that *A bisulcatus* collected in some areas had an extremely offensive odor, while in other places this feature was lacking entirely It was further stated that this variation was in a degree due to soil and climatic factors From the viewpoint of experimental physiological data it was pointed out that at the "past-seeding stage" *A bisulcatus* plants produced an accumulative type of poisoning accompanied by severe irritation to the gastro-intestinal tract Members of the chemical research staff then set about to determine the reasons for such behavior in *A bisulcatus* and other poisonous plants associated with it in habits of growth

It has now been demonstrated that those *A bisulcatus* plants yielding a decidedly offensive odor are more toxic than plants of this species lacking in this characteristic The only variable factor contributing to this difference, so far determined, is the presence of selenium

With the cooperation of the State Geologist, Dr S H Knight, and his staff, a correlation of some range plants bearing selenium has been made in conjunction with the geological formation upon which the plants grow Three species of Astragali, *A bisulcatus*, *A Grayi* and *A pectinatus*, *Xylorhiza Parryi*, *Oonopsis condensata*, *Stanleya bipinnata* and *Mentzelia decapetala* represent at this point in our investigations definite indicator plants that have shown the constant presence of selenium when collected on one or more of the following formations Niobrara, Steele, Pierre, Morrison, Wasatch (as represented by Cooper Basin), Benton, Hilliard-Cody, Lewis, Bridger, and the dark band of the Dakota These formations are mostly shale The so-called indicator plants are the richest in selenium when they occur on the undecomposed shale The element selenium is distributed throughout the entire makeup of these plants The amount in the above-ground portion of a plant exceeds that found in the root system and quantitatively[2] varies from a trace to a tenth of one per cent selenium (air-dry basis) Poisonous range plants, containing selenium, occurring on the Niobrara, Steele or Pierre shales are more poisonous to live stock, on the average, than the same plants found on the other formations listed above Whether or not, or to what extent *Stanleya bipinnata*, *Mentzelia decapetala*, *Oonopsis condensata*, *Astragalus pectinatus* and *A Grayi* are poisonous to live stock when occurring as selenium-free plants has not been determined *Xylorhiza Parryi* (woody aster) adheres so closely in Wyoming to definite shale zones that the authors have been unable to collect woody aster, selenium-free, in sufficient amounts to conclude feeding trials Out of twenty-five samples collected in various sections of the state twenty-three were found to contain varying amounts of selenium, depending upon the geological formation from which collections were made Selenium in woody aster is presumably combined with a toxic saponaceous[3] compound

---

[1] Wyoming Experiment Station Bulletin 189

Essentially the method of M Taboury, "Sur la presence accidentelle du selenium dans certains vegetaux," *Compt rend*, 195 (1932), 171

[3] A J Ewart, 'The Poisonous Action of Ingested Saponins" Council for Scientific and Industrial Research Melbourne, Australia, 50 (1931), 18

It is known that *Astragalus bisulcatus* free from selenium is poisonous to live stock, although very much less so, as brought out in this experiment Forced feeding trials demonstrated that fifty ounces of green *A bisulcatus* (blooming) selenium-free, per hundredweight of sheep failed to seriously affect an animal, whereas twenty-five ounces per hundredweight of sheep of the same plant, same stage of growth, containing selenium, produced death in a few hours

The toxic principle or principles of five out of seven of the selenium-bearing range plants (*Astragalus bisulcatus, A Grayi, A pectinatus, Oonopsis condensata, Xylorhiza Parryi*) may be extracted freely with water Similar data for *Stanleya bipinnata* and *Mentzelia decapetala* have not been obtained This physical aspect introduces a problem of economic significance because it is evident that through the annual decay of the foliage, seeds and roots of these selenium-bearing plants a considerable amount of this element goes back to the soil in a form readily available to any vegetative growth Water extracts of green *A bisulcatus* mixed with crude undecomposed Niobrara shale in experimentally controlled plats imparted to barley grown on these plats recognizable amounts of selenium Barley grown on the same shale composite without the addition of the vetch extract was found not to contain selenium

Grasses (native) growing in close proximity to type selenium-bearing range plants were found poisonous to guinea pigs when these pigs were allowed to feed on such areas

Vicia linearis, Thermopsis divaricarpa, Solidago mollis, Melilotus sp , *Iris missouriensis, Juncus balticus* and some native grasses represent a partial list of plants that have been found to contain selenium which were apparently influenced by those plants yielding soluble selenium compounds This conclusion is based upon the fact that our tests have failed to detect selenium in this same series of plants taken from uncontaminated shales It is not to be inferred that only the indicator plants listed take up selenium from the original shales The authors, however, wish to point out the unique selectivity for selenium shown by certain native plants Among the Astragali closely allied with *A bisulcatus, A Grayi* and *A pectinatus* ecologically may be mentioned *A carolinianus, A flexuosus* and *A Drummondii*, and yet careful tests have failed in detecting the presence of selenium in these last-named vetches

The following is a partial list of representative plants collected on well-defined shales found to be negative for selenium

Erigeron microlonchus Scirpus sp , Glycyrrhiza sp , Sporobolus sp , Glaux maritima Sarcobatus vermiculatus Medicago sativa, Artemisia frigida Arenaria Hookeri Sium cicutaefolium, Cicuta occidentalis, Delphinium Geyeri, Zygadenus gramineus, Senecio sp , Musineon sp , Oxytropis sp Chrysothamnus sp , Eurotia lanata, Valeriana sp and *Plantago sp*

SELENIUM POISONING

The fact that a selenium-bearing plant like *Astragalus bisulcatus* has, so far as our studies have gone, given a positive reaction for selenium when collected on either the basal, mid or top zone of a representative shale, *e g* , Steele, would sug-

NOTE *Atriplex Nuttallii* (salt bush) occurring in close proximity to the unaltered Niobrara shales has been found to contain selenium in varying amounts irrespective of other plant associations

gest that selenium is not restricted to limited areas in these shales Its original occurrence in such a comparatively few range plants further suggests the firmness with which it must be combined in the soil

There appear to be several manifestations of selenium poisoning of live stock Live stock grazing upon selenium-bearing plants may exhibit slightly different types of poisoning, depending upon the species of such plant ingested Since such variations do occur, it would seem evident that one of two conditions applies *First*, the various selenium-bearing plants may carry the element in different chemical combinations, or *second*, the selenium may be present in all plants in a similar chemical combination but the presence of other toxic substances may account for variations in the manifestations of poisoning

In Wyoming the live stock exhibiting this general type of poisoning reveal the following symptoms and lesions at autopsy The animals, particularly cattle, exhibit early in the stage of poisoning a dullness and a lack of vitality It is evident early in the stage of poisoning that there is a stasis of the gastro-intestinal tract There is considerable abdominal pain, with grunting, grating of teeth and salivation Shortly before the paralytic stage animals exhibit excitement, with a tendency to constantly wander, often aimlessly in circles The animal may or may not show impairment of vision Prior to death the animal exhibits varying degrees of paralysis, which becomes serious when it involves the swallowing mechanism In the cases observed by the authors the immediate cause of death was failure of the respiration

In general the autopsy findings of animals dying on the range of "Blind Staggers" (the term used locally to denote this type of poisoning) or of the experimental animals dying from the administration of small quantities of the sodium salt of selenious acid are in fair agreement The parenchymatous organs exhibit varying degrees of congestion, indicating a failing heart and circulation In cattle the stomachs, particularly the rumen, suggest a rather severe stasis The entire gastro-intestinal tract exhibits varying degrees of irritation, leading in some cases to hemorrhage The liver is often severely congested and the gall bladder distended with bile which may or may not exhibit normal color and consistency The bladder is usually distended with urine Whether the above conditions are due to lack of smooth muscle tone is not known Acutely poisoned animals resulting from one exclusive feeding show no marked pathology

The acute and chronic forms of poisoning mentioned above are responsible for heavy annual live stock losses in Wyoming

In a recent article in *Science* on "Selenium as an Insecticide"[1] a form of selenium poisoning is reported which would appear to be quite a different form than that noted with the selenium-bearing range plants of Wyoming The disease referred to in this article is not known to be common in this state, but where cereals, hay, etc , have produced it there is considerable evidence available which indicates that such selenium-carrying feeds were grown upon geological formations which had previously carried a stand of native selenium-bearing plants or had been contaminated by irrigation waters and rains passing over and through soils contaminated by woody aster, vetches, etc

[1] E M Nelson, A M Hurd Karrer and W O Robinson, *Science*, 78 (1933) 124

THE BIOASSAY OF PICROTOXIN AND COCCULUS INDICUS PREPARATIONS *

BY JAMES C MUNCH AND AMELIA M PONCE [1]

Cocculus Indicus and its active principle, picrotoxin, have been used for poisoning fish, for increasing the bitter taste of beer, in "knockout drops" and externally against pediculi (17, 19, 24, 25, 27, 28) Pharmacologically, picrotoxin stimulates the medullary centers producing characteristic convulsions, slowing of the pulse (vagal), and an increase in blood pressure, which is followed by paralysis after large doses (1, 24, 25)

Because of the pharmacological and toxicological interest in picrotoxin, this investigation was undertaken with a view of developing a suitable bioassay

Chemical studies have shown that Cocculus indicus contains between 1 5 and 5 0 per cent of a non-alkaloidal neutral principle, picrotoxin (1, 3, 27) Picrotoxin has been reported to have the formula $C_{30}H_{34}O_{13}$ On dissolving in water it is supposed to split into equal parts of picrotin and picrotoxinin, which are closely related chemically and have similar actions Picrotoxinin is believed to be somewhat more potent, and some experiments suggest that picrotin, $C_{15}H_{11}O_7$ is inert on cold- and warm-blooded animals (4, 7, 14 15) The available literature has not given any definite information regarding the relative toxicity of these three products The data regarding toxicity have been compiled in Table I (1, 2, 3, 4, 5, 6, 8, 9, 12, 13, 14, 18, 20, 23, 26, 27) It is believed that when administered by mouth picrotin is eliminated partly unchanged in the urine, whereas picrotoxinin is decomposed (4) Picrotoxin is soluble in about 8 parts of alcohol or 240 parts of water (19, 25) In our experience some difficulty has been encountered in obtaining this strong a solution and our findings are in agreement with the statement that picrotoxin is slightly soluble in cold water and more soluble in hot water (19)

Chemical and toxicological studies on picrotoxin and its preparations are under way, and will be reported subsequently This communication deals only with a method of physiological assay which has been developed

BIOLOGICAL ASSAYS

(*1*) *Fish* —The use of picrotoxin as a fish poison suggests the possibility of developing a method for the bioassay of these preparations on fish However, the data reported in the literature showed so wide a range of effectiveness, and the symptoms reported did not appear to be characteristic, so no quantitative methods have been developed on fish (1, 5, 6, 9, 11, 24)

(*2*) *Crabs* —*Carcinas maenas* a European sea crab is reported to be very susceptible showing convulsions after a dose of 10 *gamma* of picrotoxin Other crustaceæ are also believed to be susceptible None of these animals were readily available and have not been studied in this connection The symptoms reported did not appear to be characteristic of picrotoxin (20, 24, 27, 29)

(*3*) *Frogs* —Qualitative tests may be conducted with picrotoxin The injection of 0 5 to 1 0 mg of picrotoxin to a 30 Gm *Rana pipiens* produced a characteristic convulsion Unfortunately cicutoxin produces a similar effect, although somewhat larger doses are required The front legs are often folded across the breast, the hind legs extended with the web of the foot tightly stretched A peculiar convulsant shriek is often heard Death does not ensue for several hours

---

* Scientific Section, A PH A , Madison meeting, 1933

[1] Department of Pharmacology, Sharp and Dohme Philadelphia Pa

The susceptibility of frogs has been found to depend on the temperature, season and species Frogs may be suitable for qualitative testing but did not appear useful for quantitative bioassays of picrotoxin and its preparations (1, 9, 10, 16, 24, 27)

(4) *Mice*—In connection with studies on the potency of soporifics, Wieland and Pulewka found that the injection of 2 4 mg of picrotoxin subcutaneously to male white mice was withstood, but that larger doses caused convulsions They injected 4 mg of picrotoxin per Kg twenty minutes after the injection of the soporific or hypnotic studied (30) Rassers (22) found that picrotoxin subcutaneously injected into mice produced an S curve response of the tail similar to that produced by morphine Our studies on the toxicity of picrotoxin subcutaneously injected into the mice were in reasonable agreement among themselves, but the absolute lethal dose varied from day to day We have therefore, studied various factors believed to affect these results

Although much of this work has been done with freshly prepared solutions, which were usually made to contain 1 mg of picrotoxin per cc in recently distilled water, solutions several months old have not been found to show any different toxicity It would appear, therefore, that aqueous solutions are stable for several months

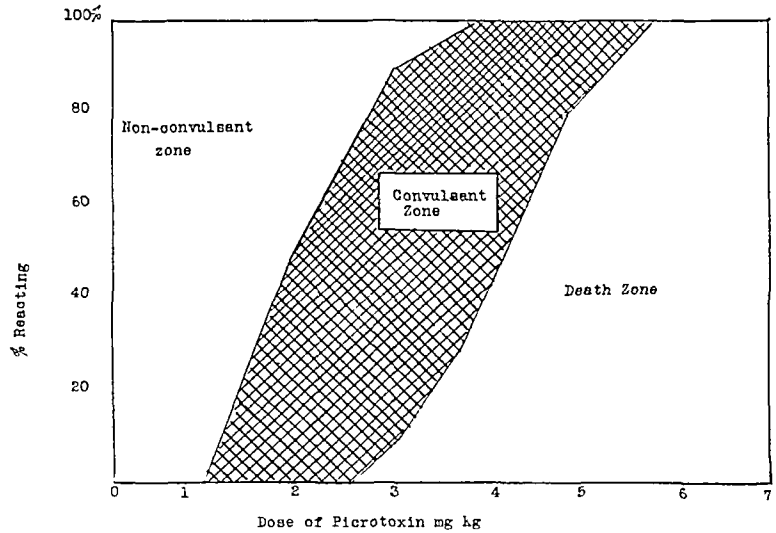


Fig 1—Effect of subcutaneous injections of Picrotoxin on mice

To avoid individual differences in mice, several hundred animals were purchased at a time from different breeders Mice were weighed to 0 5 Gm and a measured volume of solution injected under the skin of the abdomen Care was taken to prevent any loss of solution The animals were placed in cages and kept under observation for several hours to note the appearance of symptoms Very soon after injection the animals become quiet Following this, convulsions develop which are very similar to, but readily differentiated from those produced by strychnine No consistent relationship was found between the interval until the development of convulsions the period until death, and the dose administered Many mice convulse but recover The tail may show various types of curvature but does not give the characteristic S curve of morphine

In a preliminary assay, doses of 4 5 6 and 7 mg of picrotoxin per kilo and doses of 8 to 14 cc per kilo of 1 20 dilution of fluidextract (or similar dilutions of other galenicals) are injected subcutaneously into groups of five mice each The number of convulsions and of deaths are determined over a period of several hours Under certain conditions, convulsions and deaths have developed within one hour under other conditions three or four hours may be required It is difficult to specify a specific time interval, although it appears that one hour would be advisable Because of the peculiar variations in test animals both the convulsant and killing doses are considered in reaching a preliminary conclusion A desirable end point is the production of convulsions or deaths in sixty to eighty per cent of the injected animals (Fig 1)

Based upon the results of this preliminary assay, subsequent trials are made injecting groups of five mice each, in an effort to determine the dose of picrotoxin and of the unknown product which produce death in approximately eighty per cent of the injected mice within one hour ($_5LD_{80\%}$) The activity of the unknown product is then estimated in terms of picrotoxin

The results obtained in testing several samples of tincture and fluidextract of fishberries are given in Tables II and III

TABLE I —TOXICITY OF PICROTOXIN AND PICROTOXININ

Animal	Subcutaneous		Intramuscular		Oral	
	Picrotoxin	Picrotoxinin	Picrotoxin	Picrotoxinin	Picrotoxin	Picrotoxinin
Rana esculenta		1 1–2	2–10			
Doves			1 4	1 6		
Mice	2 5–6	1 6–2 0				
Guinea pigs	0 3–0 8					
Rabbits	1 3–2 8	1 35–1 6			2 5	
Cats	2 0				3 5	
Dogs	1 5–2 2	1 1	1 0			
Man					1 0–1 5	

TABLE II —CONVULSANT ACTION OF PICROTOXIN ON MICE—SUBCUTANEOUS INJECTIONS

Date	Dose Mg /Kg				
	1 0 to 1 5	2 0	2 5	3 0	3 5 to 10 0
12/27/32	0/3	1/1		1/1	5/5
1/9/33					2/2
1/16/33					1/1
1/17/33				2/2	4/4
1/18/33					1/1
1/20/33		1/1		1/1	1/1
1/24/33		0/2		1/2	4/4
1/27/33		0/2		1/2	8/8
1/30/33		2/2		2/2	2/2
1/31/33		1/1		2/2	1/1
2/1/33		0/1		1/1	2/2
2/5/33		0/1		1/1	1/1
2/6/33		0/2		2/2	3/3
		0/1		1/1	2/2
2/14/33		1/1		1/1	2/2
2/15/33		0/1		1/1	2/2
2/17/33		1/1		1/1	2/2
2/20/33		1/1		1/1	1/1
2/21/33		1/1		1/1	1/1
2/23/33		1/1		1/1	2/2
2/24/33					1/1
2/27/33		1/1		1/1	2/2
3/1/33		1/1		1/1	7/7
3/3/33	0/5		8/10	23/23	76/76
Total	0/8	12/22	8/10	46/48	133/133

This method appears promising for quantitative bioassays of picrotoxin and fishberries preparations

(5) *Rats* —A similar procedure was used in giving subcutaneous injections of picrotoxin and fishberries solution to white rats weighing between fifty and three hundred and fifty Gm although most of the test animals weighed about one hundred and fifty Gm The convulsant and lethal responses were much more erratic than those obtained in using mice Results obtained with picrotoxin injected into rats are shown in Table IV

Because of the variability of response, rats did not appear suitable for the bioassay of these products

TABLE III —THE TOXICITY OF PICROTOXIN TO MICE—SUBCUTANEOUS INJECTIONS

Date	Dose Mg /Kg 1 to 2 5	3 0	3 5	4 0	4 5	5 0	5 5	6 0 to 10
12/27/32	0/6	0/1		0/2		1/2		
1/9/33						1/2		
1/16/33						1/1		
1/17/33		0/2		0/1		2/3		
1/18/33						1/1		
1/20/33	0/1	0/1				1/1		
1/24/33		0/2				1/1		1/1
1/27/33	0/2	0/2		0/2		0/2		2/2
1/30/33	0/2	0/2				1/1		1/1
1/31/33	0/1	0/2				0/1		
2/1/33	0/1	0/1				1/1		1/1
2/5/33	0/1	0/1				1/1		
2/6/33	0/2	0/2				1/2		1/1
2/7/33	0/1	0/1				0/1		1/1
2/10/33	0/1	0/1				1/1		1/1
2/14/33	0/1	0/1				1/1		1/1
2/15/33	0/1	0/1				1/1		1/1
2/20/33	0/1	0/1				1/1		
2/21/33	0/1	0/1				1/1		
2/23/33	0/1	0/1				1/1		1/1
2/24/33						1/1		
2/27/33	0/1	0/1				1/1		1/1
3/3/33	0/1	0/1				1/1		1/1
3/6/33	0/15	16/21	5/23	6/15	7/30	4/4	6/6	5/6
8/7/33				4/10		5/10		
8/10/33				0/5		3/5		
Total	0/40	16/46	5/23	10/35	7/30	33/48	6/6	18/19

(6) *Man* —It is stated that picrotoxin has been added to beer on account of its bitter taste, and the threshold concentration reported to be bitter is 1 80 000, corresponding to 12 5 mg per liter (1 21) The results obtained in testing various concentrations are given in Table V

TABLE VI —THRESHOLD LIMEN FOR PICROTOXIN TASTE TESTS

Concentration Mg /L	Bitterness Subject 1	2	3	4	5	Remarks
5	0	0	0	0	0	
8	0	0	—	+	—	
10	0	0	0	++	0	Slightly astringent
12	0	0	—	—	—	Astringent
15	0	0	—	—	—	
20	0	0	—	—	—	
40	±	±	—	—	—	
50	+	+	—	—	—	
100	++	++	—	—	—	

In our tests on five subjects, one believed the product was definitely "bitter," whereas the other four obtained a taste which was characterized as "astringent" A peculiar numbing of the tongue develops, with various aberrations of sweet and salt tastes The taste does not appear sufficiently characteristic to justify the use of this method for bioassay

DISCUSSION

As a result of our literature studies and of our laboratory tests, we have developed the following bioassay on mice

TABLE IV —TOXICITY OF FISHBERRY PREPARATIONS TO MICE

Sample No	Product	Test	Dose Injected as 10% Tincture Cc /Kg 2 0	2 4	3 0	4 0	5 0	6 0	7 0	8 0	Picrotoxin Mg /Kg 4 0	4 5	5 0	6 0	Conclusion	Mg Picrotoxin per Cc
1	F E	1			0/2	0/3	0/2	1/4	1/2	4/4		5/10		10/10	0 8 cc = 6 mg	7 5
2	F E	1			1/5	3/5	7/10	4/5	4/5	4/5	1/2		1/2	1/1		
	F E	2				2/5	3/5				2/5		3/5		0 5 cc = 5 mg	10 0
3	F E	1			0/2	0/2	1/2	2/2			0/2		0/2	1/2		
	F E	2				1/5	5/10	8/10			4/10		6/10	5/5		
	F E	3				3/5	4/5				2/5		4/5		0 5 cc = 5 mg	10 0
4	33% Tr	1														
	33% Tr	2	0/5		5/5						2/5		4/5			
	33% Tr	3	0/5	0/5							2/5		3/5			
											0/5		3/5		1 cc more than 5 mg	5 5
															0 8 cc less than 5 mg	
5	10% Tr	1	0/5		0/5	2/5	3/5				0/5		3/5		5 cc Tr = 5 mg	1 0

TABLE V —THE TOXICITY OF PICROTOXIN TO RATS—SUBCUTANEOUS INJECTION

Date	Dose Mg /Kg 1–2	3	4	5	6	7–10
12/27/32	0/4	1/2	2/2	2/2		4/4
4/17/33		0/5	0/5	2/5	2/3	
4/17/33			2/4	5/5		
		2/5	3/5			
Total	0/4	3/12	7/16	9/12	2/3	4/4

A large number of mice are stored under identical conditions for a sufficient time to insure uniformity Groups of five mice each are weighed to 0 5 Gm and injected subcutaneously under the skin of the abdomen with solutions of picrotoxin and of the unknown fishberry product Typical picrotoxin convulsions and/or death should develop within one hour

In a preliminary trial, doses of 4, 5, 6 and 7 mg of picrotoxin per kilo may be administered, and quantities of the fishberry product estimated to be equivalent in picrotoxin content Subsequent assays should be made, based on the results of this preliminary trial, to determine the amounts of picrotoxin and of the unknown product simultaneously injected which produce death in about eighty per cent of the injected mice As a suggested standard, 5 mg of picrotoxin is recommended

CONCLUSIONS

1 Great variations in the response of individual animals have been observed following the administration of picrotoxin and of its galenical preparations

2 By the simultaneous injection of standard picrotoxin and of a galenical subcutaneously to mice, a feasible bioassay has been developed

BIBLIOGRAPHY

(1) W Autenrieth, Laboratory Manual for the Detection of Poisons and Powerful Drugs," 1928 6th Am Edition from 5th German Edition

(2) W Brockmann Uber pikrotoxin und pikrotoxinin," *Inaug Diss* Kiel (1893)

(3) C Cervello Toxicity of Picrotoxin, ' *A E P P* 64 (1911), 407, through ref 27

(4) A Chistoni *Arch farmacol sper* , 12 (1912), 385, through ref 27

(5) A Clopinsky Der forensisch chemische nachweis des pikrotoxins in tierischen flussigkeiten," *Inaug Diss* Dorpat (1883)

(6) G Dragendorff Die gerichtlich chemische ermittlung von gifte ' (1895), 344

(7) Fleishl through Barth and Kretschy ref 27

(8) F Flury and F Zernik, Zusammenstellung der toxischen und letalen dosen fur die gebrauchlichsten gifte und versuchstiere ' in Abderhalden s Handbuch der Biologischen Arbeitsmethoden, Abt IV, Teil 7, Heft 7, Lief 251 (1928)

(9) H Führer, ' Nachweis und bestimmung von giften auf pharmakologischen wege," in Abderhalden's Handbuch der Biologischen Arbeitsmethoden, Abt IV, Teil 7, Heft 2, Lief 67 revised, 1928

(10) T S Githens, through ref 24

(11) Goupil, through ref 18

(12) L Guinard and F Dumarest, *Arch intern Pharmacodynamie*, 6 (1899), 283 403, through ref 27

(13) Th Keck, ' Beitrag zur kenntnis des pikrotoxin," *Inaug Diss* Kiel (1891)

(14) R Kobert, *Ann Chem Pharm* , 222 (1884) 313 through ref 27

(15) Langgaard, through Meyer and Bruger, *Ber chem Ges* 31 (1898), 2958, through ref 27

(16) Luchsinger, "Physiologische studien" (1882)

(17) H H Meyer and R Gottlieb 'Experimental Pharmacology" (1926), 2nd Eng Edition from 7th German, 27

(18) James C Munch, ' Bioassays" (1931)

(19) F Peterson, W S Haines and R W Webster 'Legal Medicine and Toxicology " 2nd Edition (1923)

(20) J Planat *Therap* , 2 (1875) 377 through ref 27

(21) W Ramm, Hist Stud Pharm Inst Dorpat" (1890) 2 1

(22) J R F Rassers, 'Uber die spezifität der Straub Herrmannschen biologischen morphinreaktion," *Nederl tijdschr geneesk* , 2 (1915) 2111

(23) P Siegl, "Beitrag zur Kenntnis des Pikrotoxin," *Inaug Diss* , Kiel (1891)

(24) S Solis Cohen and T S Githens, "Pharmacotherapeutics" (1928)
(25) T Sollmann Manual of Pharmacology," 3rd Edition (1927)
(26) A Stuhlen, Uber Pikrotoxin und Pikrotoxinin " *Inaug Diss*, Kiel (1892)
(27) P Trendelenburg Pikrotoxin und verwandte korper," in Heffter s Handbuch der experimentellen pharmakologie, 2 (1920), 406–429
(28) U S Dispensatory, by George B Wood and F Bache, 19th Edition (1907)
(29) H de Varigny *J Anat Physiol*, 25 (1889), 187
(30) H Wieland and P Pulewka, ' Quantitative untersuchungen über den antagonismus chloralhydrat pikrotoxin Ein beitrag zur messung der wirkungsstärke von schlafmitteln,' *A E P P*, 120 (1927) 174–185

NATIONAL STANDARDS FOR TINCTURE DIGITALIS* WITH SPECIAL REFERENCE TO U S P X AND B P 1932 STANDARDS [1]

BY L W ROWE

A few years ago (1) experimental data were submitted showing the relation among five of the better known methods of bioassay of digitalis and the various standards proposed for these methods At that time the powdered digitalis leaf standard of the Geneva Conference had not been available long enough to permit of more than a very few comparative tests and it was only then being seriously considered by various foreign countries as a national standard for digitalis assay Since then Canada, in the Food and Drugs Act Regulations of 1928, and England, in the 1932 revision of the British Pharmacopœia, have definitely made the international powdered digitalis leaves their standard for the bioassay of digitalis Meanwhile Ouabain has continued as the U S Pharmacopœia standard for digitalis and in spite of its being illogical from the standpoint of relative degree of absorption in the short time period (one hour), as previously pointed out, the majority opinion favors its retention in the U S P XI Very recently Defandorf (2) has advocated revision of the present U S P "One-Hour Frog Method" to permit of a longer time period for more complete absorption and action of the diluted digitalis preparation which would be a valuable step forward He failed, however, to observe that a difference in degree of absorption between Ouabain and digitalis in any given time and particularly in different frogs may also influence the accuracy of the assay method

The assay methods which are official in the present U S P and B P are sufficiently different to make a comparison of the official tinctures quite difficult and added to this, the marked difference between the standards, Ouabain and International Standard Digitalis Leaves, makes a series of experimental tests the only basis of comparison This short paper presents such data accumulated since 1930 and permits a conclusion based on averages which should be approximately correct It should be stated before the assay results are tabulated that both the official B P 1932 tincture of digitalis and the standard extract of the international powdered digitalis leaves are made without defatting the drug while the U S P X tincture is made from defatted drug For some unknown reason the assay results

---

* Scientific Section, A PH A, Madison meeting 1933

[1] From the Research Laboratories of Parke Davis & Company, Detroit, Michigan

are more definite and in general the drug is found to be somewhat more active when not defatted, though tests have failed to show any appreciable activity in the fats after removal It is to be hoped that the U S P XI will not require the drug to be defatted, as it has been clearly shown that the nausea frequently caused by active digitalis preparations is of central origin, and also the presence of the fats does not contribute to the instability of the tincture with any degree of uniformity

The details of the methods of assay used in this series are available in the U S P X and the B P 1932 The Ouabain standard was the official No 626 obtained from the Food and Drug Administration in Washington The Canadian Standard digitalis leaves No 428 was obtained from Ottawa and certified that 0 85 Gm is equivalent to 1 0 Gm of International Standard digitalis leaves This correction was always made in preparing the standard extract The lot of International Standard used in this series was labeled "Standard Digitalis 1928" and was obtained from the National Institute for Medical Research, London, N W 3

SUMMARY OF ASSAYS

Method	Date	M L D or M S D	Relative Potency
		Sample International Standard Digitalis	
Lethal Frog	Sept 1932	0 0075 cc at 0 0075 cc	100% of Canad Std
Lethal Frog	Jan 1933	0 0040 cc at 0 0055 cc	137 5% of Canad Std
4 Hr Frog	Nov 1931	0 0060 cc at 0 0050 cc	83% of Canad Std
4-Hr Frog	Feb 1932	0 0040 cc at 0 0045 cc	112% of Canad Std
4-Hr Frog	Apr 1932	0 0040 cc at 0 0045 cc	112% of Canad Std
4 Hr Frog	Dec 1932	0 0060 cc at 0 0060 cc	100% of Canad Std
M S D Frog	Mar 1929	0 0080 cc at 0 0000006 Gm	110% of U S P Std
M S D Frog	Oct 1931	0 0050 cc at 0 0000005 Gm	120% of U S P Std
M S D Frog	Oct 1932	0 0060 cc at 0 00000070 Gm	140% of U S P Std
M S D Frog	Jan 1933	0 0060 cc at 0 00000070 Gm	140% of U S P Std
M S D Frog	July 1933	0 0070 cc at 0 00000060 Gm	103% of U S P Std
Cat Method	1929	Av M L D 1 05 cc /Kg	95% Hatcher Std
Cat Method	1933	Av M L D 1 19 cc /Kg	86% Hatcher Std
		Sample Ouabain U S P	
Cat Method	1929	Av M L D 0 105 mg /Kg	95% Hatcher Std
		Sample 1932 Digitalis	
Lethal Frog	Oct 1932	0 007 cc at 0 00000033 Gm	160% for Ouabain U S P
M S D Frog	Oct 1932	0 006 cc at 0 00000070 Gm	140% of U S P Std
M S D Frog	Oct 1932	0 006 cc at 0 006 (Inter Std)	100% of Inter Std
		Sample Canadian Standard Digitalis	
Lethal Frog	Aug 1928	0 0088 cc at 0 00000039 Gm	115% for Ouabain
Lethal Frog	Sept 1932	0 0075 cc at 0 0075 cc	100% of B P
Lethal Frog	Jan 1933	0 0055 cc at 0 0040 cc	73% of B P
4 Hr Frog	Nov 1931	0 0050 cc at 0 0060 cc	120% of Inter Std
4 Hr Frog	Feb 1932	0 0045 cc at 0 0040 cc	90% of Inter Std
4 Hr Frog	Apr 1932	0 0045 cc at 0 0040 cc	90% of Inter Std
4 Hr Frog	Dec 1932	0 0060 cc at 0 0060 cc	100% of Inter Std
M S D Frog	Apr 1932	0 0060 cc at 0 0000006 Gm	120% of U S P Std
M S D Frog	Apr 1932	0 0060 cc at 0 0000006 Gm	120% of U S P Std
M S D Frog	Jan 1933	0 0055 cc at 0 0000007 Gm	152% of U S P Std
M S D Frog	July 1933	0 0060 cc at 0 0000006 Gm	120% of U S P Std

DISCUSSION

Assay results by the lethal frog method, which includes also the four-hour method, show that the International Standard digitalis leaves and the Canadian Standard leaves are very nearly equal to each other in activity, as they should be An average of six tests shows the International Standard to be 107% of the Canadian Standard or that the latter is 93 5% of the former This is a close enough agreement experimentally to consider them equal

By the U S P X one-hour method and against the official Ouabain standard the International Standard tincture averages 123% of the U S P in five tests and the Canadian Standard tincture averages 128% of the U S P or nearly the same as the B P Since each of these averages contains one or two high results obtained on winter frogs (Jan 1933) it would seem that the B P and Canadian Standard tinctures of digitalis are from 20% to 25% more active than the U S P Standard tincture and that conservatively the difference might be considered as being fully 20%

By the cat method (two tests) the International Standard seems to be fully 90% of the standard proposed by Hatcher for Tincture of Digitalis but this series of tests is not large enough to prove much except that the B P 1932 Standard Tincture of Digitalis is about equal to the Hatcher Standard

CONCLUSIONS

1 The standard tincture of digitalis of the British Pharmacopœia, 1932 revision, is fully 20% more active than the U S P X Standard This difference is significant and is difficult to determine because of the recommended use of different standards and methods of bioassay

2 The B P 1932 Standard tincture and the Canadian Standard, 1928 regulations, Food and Drugs Act are equal, within the limits of experimental error of the methods of assay, as they should be

BIBLIOGRAPHY

(1) Rowe, Jour A Ph A , 18 (1929) 1138
(2) Defandorf, *Ibid* 22 (1933), 599

PHYTOCHEMICAL NOTES *

No 110 The Sterols from Stramonium Seed [1]

BY OLE GISVOLD

The unsaponifiable material obtained by Ralph Clark in his study of the fatty acids of stramonium seed (1) was heated under a vacuum on a water-bath for a half day It was then allowed to stand for several days in a vacuum desiccator in order to remove any traces of moisture present Ten grams of this material (2) were dissolved in sufficient alcohol to make 150 cc of solution Two and one-half grams of digitonin, Merck, were dissolved in 250 cc 90 per cent alcohol Both

* From the laboratory of Edward Kremers

[1] Scientific Section, A Ph A , Toronto meeting, 1932

solutions were heated to 65° and the digitonin solution was added to the solution of the unsaponifiable material An immediate separation of the digitonide took place The mixture was allowed to stand over night and filtered by means of suction The precipitate was suspended in alcohol, filtered off again and the precipitate washed several times with alcohol and ether

A test made with the first mother liquor gave a precipitate with digitonin Therefore, 200 cc of 1 per cent digitonin solution were added to the mother liquor in the manner previously described There was no immediate precipitate, but upon cooling the digitonide crystallized out After standing over night the precipitate was treated as previously described It is a distinct advantage to thoroughly wash the digitonide as previously described, otherwise oil will be encountered in the crystallization of the sterol As the solubility of the digitonide is only 0 014 (3) Gm in 100 cc alcohol at 18°, the loss of sterol cannot be appreciable The second mother liquor was concentrated to half its volume, when upon cooling, a third though small quantity of digitonide settled out

Dried in a desiccator the following weights of the precipitates were determined

I	2 9809 Gm	
II	1 9030 Gm	
III	0 4014 Gm	
Total	5 2853 Gm	corresponding to 1 321 Gm of sterol or 13 21 per cent of the unsaponifiable material

Precipitate No I, placed in a thimble, was extracted for ten hours with xylene by continuous percolation The xylene of the resulting solution was evaporated on a water-bath under reduced pressure The residue left in the flask was then dissolved in ether, alcohol added to the solution and the ether boiled off A small quantity of charcoal was added to the alcoholic solution and the mixture boiled gently for a few moments with continuous agitation, and then filtered The alcoholic filtrate of the sterol was reheated and just enough water added until the temporary turbidity thus produced threatened to become permanent Upon cooling beautiful opaque leaflets were obtained which upon recrystallization, melted at 134° to 135° The mother liquor yielded crystals m p at 127° to 128° The first crop of crystals was acetylated by boiling gently for one hour with an excess of acetic acid anhydride Upon recrystallization the acetate melted at 131° to 132° The acetate was saponified (4) and upon recrystallization the regenerated sterol melted at 137° to 138°

When treated according to Windaus u Hauth, the acetate gave no precipitate, indicating the absence of stigmasterol (7)

Burian's sitosterol (5) melts at 137° to 138°, its acetate at 127° to 128°

Anderson and Shriner (6) have shown that the sterol obtained from corn oil m p 137° to 138° can be resolved into γ, β and α sitosterol

Anderson and Nabenhauer (8), report a highly purified sitosterol m p 138° to 139°, the acetate melting at 130° to 131°

Digitonide precipitates II and III were combined and were subjected to the same treatment as No I The recovered sterol crystals were combined with those that had previously been obtained as a second drop of the first batch with a m p

127° to 128° because of similarity of m p The acetate obtained upon recrystallization melted at 120° to 121°

The material marked "III A" by Clark was recrystallized Beautiful almost transparent leaflets were obtained which melted at 135° Even after drying at 100° over P_2O_5 in a vacuum the melting point was not changed

The remainder of the unsaponifiable material which amounted to 53 Gm was treated with digitonin in the manner previously described The sterol thus obtained exhibited the same physical properties as that obtained before, *i e*, the free sterol melted at 138°, and the acetate melted at 131° to 132°

A mixed melting point was made with the sterol obtained from digitalis seed and no change in the melting point could be noticed Evidently the two sterols are identical

The sterol acetate was saponified with alcoholic potassium hydroxide (half normal) by refluxing for one and one-half hours The excess alkali was back titrated with half normal hydrochloric acid The values thus obtained indicate that the sterol has the composition $C_{26}H_{43}OH$

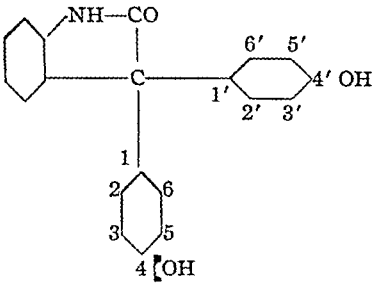
BIBLIOGRAPHY

(1) The results of this investigation will be published later
(2) A Windaus *Ber*, 42 (1909) 240
(3) *Ibid*
(4) Windaus and Hauth *Ibid* 39 (1906) 4382
(5) Burian *Monatsh Chem* 18 (1897), 551
(6) Anderson and Shriner, *J Am Chem Soc*, 48 (1926), 2967
(7) Windaus and Hauth, *Ber*, 39 (1906), 4381
(8) Anderson and Nabenhauer, *J Am Chem Soc* 46 (1924), 2113

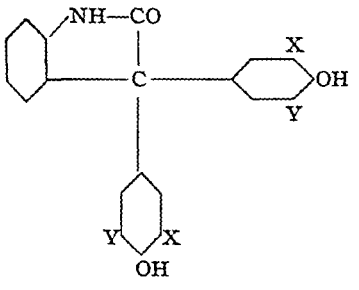
MERCURATED SUBSTITUTION PRODUCTS OF DIPHENOL ISATIN *

BY S E HARRIS AND W G CHRISTIANSEN

The results obtained during our study of mercury derivatives of phthaleins derived from *o*-hydroxy diphenyl (1) suggested that therapeutically valuable mercury compounds should be found among compounds of similar general structure Diphenol isatin (I) was selected as the parent substance for the investigation and a number of mercury derivatives of the substituted products (II) (Y = NO_2 or Br, X = H, C_6H_5, CH_3, NO_2 or Br) were prepared



(I)



(II)

* Scientific Section, A PH A Toronto meeting 1932

All of the compounds studied possessed considerable bactericidal properties and the results obtained when they were tested against *B Typhosus* in aqueous alkaline solution are shown in Table I

TABLE I

Diphenol Isatin Derivative	Highest Dilution Which Kills *B Typhosus* in 5 Minutes
Acetoxy mercuri 3,3′, 5 5′ tetrabromo	1–10,000
Diacetoxy mercuri 3 3′ dibromo	1–500
Acetoxy mercuri 3,3′ dinitro-	1–30,000
Diacetoxy mercuri 3,3′ dinitro	1–10,000
Acetoxy mercuri 3,3′ dibromo 5,5′ dimethyl	1–500
Diacetoxy mercuri 3,3′ dinitro 5 5′ dimethyl-	1–1,000
Acetoxy mercuri 3,3′ dibromo 5,5′ diphenyl-	1–1,500
Diacetoxy mercuri 3,3′ dibromo 5,5′ diphenyl	1–1,500
Diacetoxy mercuri 3,3′ dinitro 5,5′ diphenyl	1–1,000
Diacetoxy mercuri 3,3′ dibromo diresorcin isatin	1–500
Hydroxy mercuri 3,3′ dinitro diresorcin isatin	1–1,000

The preparation of the intermediates was carried out by introducing the substituent into diphenol isatin prepared by the method of Baeyer and Lazarus (2), in which one molecule of isatin is condensed with two molecules of phenol by adding a small quantity of concentrated H_2SO_4 to a mixture of the two compounds 5,5′-dimethyl- and 5,5′-diphenyl-diphenol isatin were prepared in the same manner by condensing, respectively, *o*-cresol and 2-hydroxy diphenyl with isatin It was found that diresorcin isatin could not be prepared in this way, since the high temperature required to melt the resorcin led to an extremely violent reaction with formation of tars Condensation proceeded smoothly in glacial acetic acid solution, the product being formed without the usual elimination of water between two hydroxyl groups It was subsequently observed that substitution under mild conditions, *e g*, in glacial acetic acid, bromination could be effected without closing the oxonium ring at positions 6 and 2′, whereas nitration in concentrated sulphuric acid led to the elimination of water

Mercuration was in general effected by the method previously described (1), but in a number of cases this led to the formation of mixtures of mono, di- and trimercury derivatives which we were unable to separate, the compounds being characterized by complete insolubility in organic solvents Other means of mercuration were adopted in such cases The compounds obtained were all readily soluble in a slight excess of aqueous alkali In no case was a melting point observed, the compounds decomposing without melting when heated The position of the mercury has not been determined There is ground for belief, however, that in some cases the mercury enters the isatin residue while in others it enters the phenol residue This, as in the case of the phthalein, is based on the readiness with which disubstitution occurs in certain nitro derivatives, while we have been unable to introduce a second mercury into 3,3′,5,5′-tetrabromo diphenol isatin This indicates that in acetoxy tetrabromo diphenol isatin a single mercury enters the isatin residue, and that in diacetoxy mercuri 3,3′-dinitro diphenol isatin we have mercury substitution at the 5 and 5′ positions The high-mercury analyses reported in the experimental part indicates that in the latter compound there is some formation of the triacetoxy mercuri derivative, with the third mercury entering the isatin residue

Analysis for mercury was carried out by the method of Whitmore (3), but with somewhat unsatisfactory results As stated elsewhere (1) the method of Tabern and Shelberg (4) is now used in this laboratory

EXPERIMENTAL

3,3'-Dibromo Diphenol Isatin —3 17 Gm diphenol isatin (2) was suspended in 40 cc glacial acetic acid and a solution of 3 2 Gm bromine in 10 cc glacial acetic acid added dropwise with stirring The reaction product was isolated by dilution with water, and recrystallized from benzene as a fine white powder

Melting point—144–145° C
Yield—88%
Analysis (Parr bomb) Br—Found 33 92%, 33.24% Calc for $C_{20}H_{13}NO_3Br_2$—33 83%

Diacetoxy Mercuri 3,3'-Dibromo Diphenol Isatin —General method of mercuration in alcohol solution 3 5 Gm of dibromo diphenol isatin was dissolved in 35 cc alcohol and the boiling solution treated with a solution of 4 7 Gm of mercuric acetate in 15 cc water acidified with acetic acid Stirring and boiling was continued until a side test with NaOH showed absence of ionic mercury The precipitated mercury derivative was then filtered off and washed with alcohol and ether It formed a pale yellow sandy powder insoluble in the common organic solvents, readily soluble in dilute alkalies

Yield—Quantitative
Hg—Found 41 3% Calc for $C_{24}H_{17}NO_7Br_2Hg$—42 5%

3,3',5,5'-Tetrabromo Diphenol Isatin —48 Gm diphenol isatin was suspended in 480 cc glacial acetic acid and 97 Gm bromine added dropwise with stirring The mixture was allowed to stand for an hour and then poured into 3 liters of water A fine greenish precipitate formed which was filtered off, washed with water and recrystallized from alcohol

Yield—Quantitative M p decomposes above 275° C
Br (Parr bomb)—Found 50 82%, 50 87% Calc for $C_{20}H_{13}NO_3Br_4$—50 56%

Acetoxy Mercuri 3,3',5,5'-Tetrabromo Diphenol Isatin —91 Gm tetrabromo diphenol isatin was dissolved in 144 cc 2 *N* NaOH and 150 cc of water To the boiling solution a hot solution of 46 Gm mercuric acetate in 20 cc *N* acetic acid and 150 cc of water were added, and heating and stirring continued for a few minutes after the addition was complete The mercury derivative was precipitated as a bluish gelatinous mass, to which 2 liters of water and sufficient NaOH to dissolve the product were added After filtering off a small insoluble impurity the mercury derivative was regenerated, by the addition of acetic acid, as a thick gelatinous mass, very difficult to filter and wash

Yield—Quantitative
Hg—Found 24 3% Calc for $C_{22}H_{15}NO_5Br_4Hg$—22 5%

3,3'-Dinitro Diphenol Isatin —3 17 Gm diphenol isatin was suspended in 25 cc glacial acetic acid and 1 5 cc HNO_3 (Sp Gr 1 4) was added dropwise with stirring After warming a short time on the water-bath to complete the reaction, the solution was poured into 400 cc water and the precipitate recrystallized from dilute alcohol

Yield—3 Gm M p decomposes at 225° C
N—Found 10 54%, 10 86% Calc for $C_{20}H_{18}N_3O_7$—10 37%

Diacetoxy Mercuri 3,3'-Dinitro Diphenol Isatin—Mercuration was carried out by the general method The product was a bright yellow powder

Yield—Quantitative
Hg—Found 47 1%, 48 1% Calc for $C_{24}H_{17}N_3O_{11}Hg_2$—43 5%

All methods of preparation gave products with a high and variable mercury content

Diresorcin Isatin—5 6 Gm isatin and 8 2 Gm resorcin were suspended in 50 cc glacial acetic acid, and conc H_2SO_4 added drop by drop with good stirring till the isatin color disappeared and a homogeneous solution resulted On pouring into 500 cc water and standing, a fine white powder was precipitated A suitable solvent for recrystallization was not found

Yield—6 Gm M p decomposes above 270° C						
Found	C	68 9	H	4 2	N	3 89
		68 8		4 5		4 08
Calc for $C_{20}H_{18}NO_6$	C	68 8	H	4 3	N	4 01%

3,3'-Dibromo Diresorcin Isatin—7 Gm diresorcin isatin in 50 cc glacial acetic acid was treated with 6 3 Gm bromine dissolved in 10 cc glacial acetic acid The product was isolated by dilution with water, and recrystallized from alcohol

M p 250–255° with decomposition

Diacetoxy Mercuri 3,3'-Dibromo Diresorcin Isatin—2 Gm of the dibromo compound was mercurated by the general method with 2 5 Gm mercuric acetate

Yield—90%
Hg—Found 38 4% Calc for $C_{24}H_{16}NO_6Br_2Hg_2$—39 2%

3,3'-Dinitro Diresorcin Isatin—5 Gm diresorcin isatin was dissolved in 30 cc conc H_2SO_4 and cooled to 0° C To this solution a mixture of 2 8 cc HNO_3 and 3 cc H_2SO_4 was added drop by drop, keeping the temperature at 0° C After stirring for a further period of 30 minutes the reaction mixture was diluted with 5 volumes of water, the precipitate filtered off and washed The brown reaction product was very soluble in alcohol and glacial acetic acid but did not separate in a crystalline form on evaporation or dilution It was insoluble in ether, benzene and chloroform Decomposed without melting at 220° C

Yield—Practically quantitative
N—Found 10 16%, 10 65% Calc for $C_{20}H_{12}N_4O_8$ 9 97%

Hydroxymercuri 3,3'-Dinitro Diresorcin Isatin—4 2 Gm 3,3'-dinitro diresorcin isatin was dissolved in 50 cc *N* NaOH and a hot solution of 6 Gm mercuric acetate in 25 cc water acidified with acetic acid added After standing a short time the mercury derivative was precipitated by adding dilute H_2SO_4, filtered off and washed with water, alcohol and ether

Hg—Found 32 8%, 32 0% Calc for $C_{20}H_{10}N_2O_9Hg$ 31 5%
Yield—Practically quantitative

3,3'-Diphenyl-Diphenol Isatin—20 Gm 2-hydroxy diphenyl was melted and 5 Gm isatin suspended in the molten mass, maintaining the temperature at about

60° C 2 cc conc H_2SO_4 was added dropwise and stirring continued until the reaction mixture set to a solid cake This was then broken up and boiled with water to remove traces of 2-hydroxy diphenyl The product was purified by recrystallization from alcohol and water or by solution in NaOH and reprecipitation with dilute acid It forms a white powder, m p 183–185° C

Found	C 82 3	H 4 95	N 2 87, 2 95
Calc for $C_3H_3NO_3$	C 81 9	H 4 90	N 3 00%

3,3'-Diphenyl 5,5'-Dibromo Diphenol Isatin —31 Gm 3,3'-diphenyl diphenol isatin, dissolved in 300 cc alcohol or glacial acetic acid, was treated with 20 5 Gm bromine dropwise After standing for a short time the product was isolated by dilution with 1 5 liters water, and recrystallized from dilute acetic acid

Yield—96% M p 115° C
Br—Found 27 49% Calc for $C_{30}H_{17}NO_3Br$ 26 69%

Acetoxy Mercuri 3,3'-Diphenyl 5,5'-Dibromo Diphenol Isatin —The dibromo compound on mercuration by the general method gave a brownish sandy powder in quantitative yield

Hg—Found 22 4% Calc for $C_{34}H_{23}NO_5Br\,Hg$ 22 7%

Diacetoxy Mercuri 3,3'-Dibromo 5,5'-Diphenyl Diphenol Isatin —The bromo compound was mercurated by the general method using two equivalents of mercuric acetate The properties resembled those of the mono-mercury derivative

Hg—Found 36 0% Calc for $C_{36}H_{26}NO_7Br\,Hg$ 35 1%

3,3'-Diphenyl 5,5'-Dinitro Diphenol Isatin —4 7 Gm 3,3'-diphenyl diphenol isatin was dissolved in glacial acetic acid and treated with 1 5 cc HNO_3 (Sp Gr 1 4) The product was isolated by dilution with water, and recrystallized from alcohol Yellow needles m p 148° C

Yield—Practically quantitative
N—Found 7 34% Calc for $C_{32}H_{21}N_3O_7$ 7 51%

Diacetoxy Mercuri 3,3'-Diphenyl 5,5'-Dinitro Diphenol Isatin —Mercuration by the general method gave a brown sandy powder assaying rather high for mercury

Hg—Found 44 6%, 44 0% Calc for $C_{36}H_{25}N_3O_{11}Hg$ 37 3%

As in the case of dinitro diphenol isatin, all attempts to prepare pure dimercury derivatives gave a partially trimercurated mixture

3,3'-Dimethyl 5,5'-Dibromo Diphenol Isatin —13 Gm di-*o*-cresol isatin (5) prepared in the same manner as diphenol isatin, was dissolved in 125 cc glacial acetic acid and treated with 13 Gm bromine About 30% of the product was precipitated as a micro-crystalline powder while the remainder was obtained on dilution with water Recrystallized from glacial acetic acid, it formed needles

Yield—90% M p decomposes 250° C
N—Found 2 78% Calc for $C_{32}H_{17}NO_3Br$ 2 79%

Acetoxy Mercuri 3,3'-Dimethyl 5,5'-Dibromo Diphenol Isatin —On mercuration in alcohol solution by the general method the reaction appeared to be reversible since long boiling failed to give a negative test for inorganic mercury The crude

product was freed from the unchanged isatin derivative by repeated extraction with boiling alcohol

Hg—Found 26 0% Calc for $C_{14}H_{19}NO_6Br_2Hg$ 26 4%

3,3'-Dinitro 5,5'-Dimethyl Diphenol Isatin—24 Gm di-*o*-cresol isatin (5) was dissolved in 25 cc glacial acetic acid and treated with 10 cc HNO_3 (Sp Gr 1 4) After warming on the water-bath for 15 minutes the product was precipitated by adding water and recrystallized from alcohol Yellow micro-crystalline powder m p 238–240° C

N—Found 9 68% Calc for C $H_{18}N_3O_7$ 9 65%

Diacetoxy Mercuri 3,3'-Dinitro-5,5'-Dimethyl-Diphenyl Isatin—The nitro compound when mercurated in alcohol by the general method gave a partially trimercurated product, as in the case of the other nitro derivatives

Hg—Found 44 7% Calc for $C_{14}H_{18}N_3O_9Hg_2$ 43 3%

SUMMARY

A number of new derivatives of diphenol isatin have been prepared The mercury derivatives of these compounds have been prepared and their bactericidal properties investigated

REFERENCES

(1) Harris and Christiansen, JOUR A PH A, 22 (1933), 723
(2) Baeyer and Lazarus, *B*, 18 (1885), 2642
(3) Whitmore, "Organic Compounds of Mercury," Chem Cat Co, N Y, 1921
(4) Tabern and Shelberg Private Communication A D M A Committee on Synthetic Organic Chemicals
(5) U S Patent 1,624,675

RESEARCH DEPT OF THE CHEMICAL & PHARMACEUTICAL LABORATORIES
E R SQUIBB & SONS, BROOKLYN N Y

THE VALUE OF SENECIO IN MEDICINE *[1]

BY EDGAR A KELLY AND E V LYNN

In a preliminary report two years ago (3) we recorded a partial examination of senecio Since then we have completed the study and extended it to include the pharmacology

CHEMICAL

The material employed was obtained in the open market and was entirely within the official requirements, but we have no knowledge of place or time of gathering

Proximate analysis of various samples gave results as follows moisture 6 49 to 10 92 per cent, ash 8 33 to 11 85 per cent, starch, by diastase 7 85, by acid hydrolysis 10 20 per cent, tannin 6 14 per cent

---

* Scientific Section, A PH A Madison meeting 1933

[1] Research conducted under the grant of the National Conference on Pharmaceutical Research

For the purpose of complete examination, 13 Kg of the ground drug was exhausted with hot alcohol After removal of the greater part of the solvent, there was obtained 2 67 Kg of a dark, viscid mass

Volatile Oil—By steam distillation of this extract there was produced 13 6 Gm , or 0 1 per cent, of an essential oil which was acid to litmus and possessed the characteristic, aromatic and spicy odor of the drug It was light amber in color when first obtained but darkened on standing to a reddish brown color, thus exhibiting the presence of unstable compounds The oil thus changed had the following constants d_{25} 1 0072, n_D^{20} 1 4942, $[\alpha]_D$ + 27 91°, acid number 52 47, ester value 89 63 It gave no test for nitrogen or sulphur when submitted to the sodium-fusion method, the former report of finding sulphur was probably due to contaminated steam The previous refraction (1 4511) was obtained with only a few drops of oil

After rectification by steam, the oil had the following constants d_{25} 0 9862, n_D^{20} 1 4921, $[\alpha]_D$ + 40 74°, acid number 25 33, ester value 60 47 These indicated unsaturated or aromatic compounds with comparatively large amounts of free acids and some esters

Aqueous Residue—The residual, dark brown, aqueous liquid was separated from the resins and evaporated to a convenient volume under reduced pressure Repeated extraction with ether gave 25 Gm of semi-solid, from which ammonium carbonate withdrew 16 4 Gm (0 12 per cent) of oil representing free, non-volatile acids Sodium carbonate solution extracted 1 15 Gm (0 01 per cent), more than half of which crystallized in long needles melting at 129–130° C and which was probably a lactone It was soluble in benzene, ether, chloroform or hot water, but insoluble in petroleum ether or cold water, and was acid to litmus From the original ethereal extract sodium hydroxide solution removed 0 41 Gm (0 003 per cent) of phenols

From the aqueous concentrate amyl alcohol extracted 32 Gm (0 25 per cent) of a syrupy material Most of this remained liquid even after standing for several months, but there separated 0 6 Gm of a brown, amorphous powder which was apparently an anthraquinone derivative

In the remaining aqueous product, which represented chiefly sugars, nothing else beside sugars was found At no time was there any indication of glucosides and no characteristics of a saponin

The Resins—The solid portion from distillation amounted to 950 Gm or about 7 per cent of the original drug Of this black tarry mass, representing the fixed oil, phytosterol, resin, wax, etc , 18 per cent was removed by petroleum ether and subsequently 15 per cent by ether, both extracts being dark green and unctuous Chloroform extracted from the residue 14 per cent of a black, brittle solid and alcohol then removed 9 per cent of black semi-solid, these probably being chiefly wax and resin Nearly half of the original remained as a black mass

Alkaloid—In our previous report the presence of alkaloid was indicated In order to determine this more carefully a large quantity of drug was exhausted with alcohol and the latter was largely removed by distillation The residue was extracted with 2 per cent hydrochloric acid, producing a brown solution which gave copious precipitates with Wagner's or Mayer's reagents and with phosphotung-

stic acid, phosphomolybdic acid or picric acid, but none with tannic acid, Dragendorff's or Marme's reagents, platinic chloride or gold chloride

The acid solution was made alkaline and extracted with a mixture of three parts ether and one part chloroform The dried extracts were combined and evaporated to dryness, leaving a green, mobile oil corresponding to 0 006 per cent of the dried plant It was acid to litmus and possessed a bitter and burning taste

Weighed portions of the residue were tested for nitrogen by the sodium-fusion method Amounts representing as much as 600 Gm of the crude drug failed to give a positive test Since, in our hands, as little as 4 mg of strychnine will give the characteristic blue, and assuming that the proportion of nitrogen is about the same, we conclude that alkaloids are not present in senecio in amounts greater than 1 150,000

At the time this work was being conducted, Manske (4) was also testing senecio for the presence of alkaloid His results, which did not include a test for nitrogen, led him to draw doubtful conclusions

Inulin—Precipitated calcium carbonate was mixed with 600 Gm of the crude drug in order to neutralize plant acids and the mixture was introduced into an equal volume of boiling water and heated on the steam-bath After about four hours it was strained through muslin and expressed These processes were repeated three times, when the liquid was filtered until clear and the tannins, colors, etc, were precipitated with neutral lead acetate Basic lead acetate produced no more precipitate After removing the lead with sodium phosphate the filtrate was reduced to one-third its volume by evaporation under reduced pressure

Addition of an equal volume of alcohol caused precipitation of a white amorphous substance which was filtered and washed with alcohol and ether The tasteless substance, resembling starch in appearance, was insoluble in cold water and organic substances but, unlike starch, gave a clear solution in hot water After purification its solution was neutral to litmus, produced no change with iodine and did not reduce Fehling's solution After hydrolysis by boiling with dilute hydrochloric acid for one minute, however, it produced an immediate reduction of hot Fehling's solution A hydrolyzed solution gave a deep red color and a red precipitate when boiled with resorcinol in hydrochloric acid, thus proving the hydrolytic product to be a ketone sugar The specific rotation was −38 6°, of pure inulin −39 5°, of soluble starch +169 1° The hydrolytic product had a specific rotation of −95 7°, comparable to the −98 8° of levulose The original substance is thus proved to be inulin, which is present to the extent of about 7 85 per cent

While inulin is quite prevalent in plants of the composite family, this is the first instance we can find that it has been found in a senecio

The liquid from which the inulin had been precipitated was evaporated to a small volume under reduced pressure and was then allowed to stand for several weeks, being subject to some evaporation in the meantime Nothing crystalline was thus obtained and other properties of the residue would seem to indicate that glucosides are either absent or present only in very small quantities

PHARMACOLOGICAL

Attempts to isolate and identify compounds to which the reputed value could be attributed having failed, attention was next turned to the pharmacology

For the purpose of complete examination, 13 Kg of the ground drug was exhausted with hot alcohol After removal of the greater part of the solvent, there was obtained 2 67 Kg of a dark, viscid mass

Volatile Oil—By steam distillation of this extract there was produced 13 6 Gm , or 0 1 per cent, of an essential oil which was acid to litmus and possessed the characteristic, aromatic and spicy odor of the drug It was light amber in color when first obtained but darkened on standing to a reddish brown color, thus exhibiting the presence of unstable compounds The oil thus changed had the following constants d_{25} 1 0072, n_D^{20} 1 4942, $[\alpha]_D$ + 27 91°, acid number 52 47, ester value 89 63 It gave no test for nitrogen or sulphur when submitted to the sodium-fusion method, the former report of finding sulphur was probably due to contaminated steam The previous refraction (1 4511) was obtained with only a few drops of oil

After rectification by steam, the oil had the following constants d_{25} 0 9862, n_D^{20} 1 4921, $[\alpha]_D$ + 40 74°, acid number 25 33, ester value 60 47 These indicated unsaturated or aromatic compounds with comparatively large amounts of free acids and some esters

Aqueous Residue—The residual, dark brown, aqueous liquid was separated from the resins and evaporated to a convenient volume under reduced pressure Repeated extraction with ether gave 25 Gm of semi-solid, from which ammonium carbonate withdrew 16 4 Gm (0 12 per cent) of oil representing free, non-volatile acids Sodium carbonate solution extracted 1 15 Gm (0 01 per cent), more than half of which crystallized in long needles melting at 129–130° C and which was probably a lactone It was soluble in benzene, ether, chloroform or hot water, but insoluble in petroleum ether or cold water, and was acid to litmus From the original ethereal extract sodium hydroxide solution removed 0 41 Gm (0 003 per cent) of phenols

From the aqueous concentrate amyl alcohol extracted 32 Gm (0 25 per cent) of a syrupy material Most of this remained liquid even after standing for several months, but there separated 0 6 Gm of a brown, amorphous powder which was apparently an anthraquinone derivative

In the remaining aqueous product, which represented chiefly sugars, nothing else beside sugars was found At no time was there any indication of glucosides and no characteristics of a saponin

The Resins—The solid portion from distillation amounted to 950 Gm or about 7 per cent of the original drug Of this black tarry mass, representing the fixed oil, phytosterol, resin, wax, etc , 18 per cent was removed by petroleum ether and subsequently 15 per cent by ether, both extracts being dark green and unctuous Chloroform extracted from the residue 14 per cent of a black, brittle solid and alcohol then removed 9 per cent of black semi-solid, these probably being chiefly wax and resin Nearly half of the original remained as a black mass

Alkaloid—In our previous report the presence of alkaloid was indicated In order to determine this more carefully a large quantity of drug was exhausted with alcohol and the latter was largely removed by distillation The residue was extracted with 2 per cent hydrochloric acid, producing a brown solution which gave copious precipitates with Wagner's or Mayer's reagents and with phosphotung-

stic acid, phosphomolybdic acid or picric acid, but none with tannic acid, Dragendorff's or Marme's reagents, platinic chloride or gold chloride

The acid solution was made alkaline and extracted with a mixture of three parts ether and one part chloroform The dried extracts were combined and evaporated to dryness, leaving a green, mobile oil corresponding to 0 006 per cent of the dried plant It was acid to litmus and possessed a bitter and burning taste

Weighed portions of the residue were tested for nitrogen by the sodium-fusion method Amounts representing as much as 600 Gm of the crude drug failed to give a positive test Since, in our hands, as little as 4 mg of strychnine will give the characteristic blue, and assuming that the proportion of nitrogen is about the same, we conclude that alkaloids are not present in senecio in amounts greater than 1 150,000

At the time this work was being conducted, Manske (4) was also testing senecio for the presence of alkaloid His results, which did not include a test for nitrogen, led him to draw doubtful conclusions

Inulin.—Precipitated calcium carbonate was mixed with 600 Gm of the crude drug in order to neutralize plant acids and the mixture was introduced into an equal volume of boiling water and heated on the steam-bath After about four hours it was strained through muslin and expressed These processes were repeated three times, when the liquid was filtered until clear and the tannins, colors, etc, were precipitated with neutral lead acetate Basic lead acetate produced no more precipitate After removing the lead with sodium phosphate the filtrate was reduced to one-third its volume by evaporation under reduced pressure

Addition of an equal volume of alcohol caused precipitation of a white amorphous substance which was filtered and washed with alcohol and ether The tasteless substance, resembling starch in appearance, was insoluble in cold water and organic substances but, unlike starch, gave a clear solution in hot water After purification its solution was neutral to litmus, produced no change with iodine and did not reduce Fehling's solution After hydrolysis by boiling with dilute hydrochloric acid for one minute, however, it produced an immediate reduction of hot Fehling's solution A hydrolyzed solution gave a deep red color and a red precipitate when boiled with resorcinol in hydrochloric acid, thus proving the hydrolytic product to be a ketone sugar The specific rotation was −38 6°, of pure inulin −39 5°, of soluble starch +169 1° The hydrolytic product had a specific rotation of −95 7°, comparable to the −98 8° of levulose The original substance is thus proved to be inulin, which is present to the extent of about 7 85 per cent

While inulin is quite prevalent in plants of the composite family, this is the first instance we can find that it has been found in a senecio

The liquid from which the inulin had been precipitated was evaporated to a small volume under reduced pressure and was then allowed to stand for several weeks, being subject to some evaporation in the meantime Nothing crystalline was thus obtained and other properties of the residue would seem to indicate that glucosides are either absent or present only in very small quantities

PHARMACOLOGICAL

Attempts to isolate and identify compounds to which the reputed value could be attributed having failed, attention was next turned to the pharmacology

This involved determination of toxicity, action on the excised uterus and on the uterus in a living animal

Toxicity—The animals used were two fully grown, healthy, white rats, one male and one female The fluidextract, administered orally by means of a medicine dropper, was given in increasing doses at intervals of one or two days in order that there would be no accumulation No effects were noted at any time Since the largest dose corresponded to 100 times the average for man, the fluidextract can be considered non-toxic to rats

Weighed quantities of the crude drug were mixed with glucose, rolled into pills and administered to a rabbit weighing 2406 Gm Three doses were given at intervals of two days The first, 4 Gm of senecio, corresponded to 0 17 per cent of the body weight, the second of 12 Gm to 0 5 per cent and the third of 24 Gm to 1 0 per cent In order to get the same amount of drug per Kg, the average adult person would need to ingest 700 Gm None of these enormous doses produced any outwardly evident effects and it can be concluded that senecio is entirely non-toxic

Isolated Uterine Strip—The only previous investigation of this nature on senecio was made by Pilcher in 1916 (2), who finally concluded that the fluidextract gives no constant action on the excised uterus of guinea pigs In high concentration, however, there was an indication that the drug is depressant

The animals used were adult, non-pregnant rabbits and cats The rabbit was killed by a blow on the head, the vessels in the neck were cut and the animal was rapidly bled The abdomen was opened and the entire uterus, including the ovaries and a part of the vagina, was removed to a beaker containing Ringer-Dale solution The cats were anesthetized by ether instead of being killed before bleeding

On a warm, moistened tile, one horn of the uterus was cut longitudinally with sharp scissors and, with the muscle laid flat, a segment was made 1 5 cm long and 0 5 cm wide Holes were pierced in each end to receive pieces of silk thread which were tied securely, one being attached to a muscle lever, the other to a writing lever The uterine strip, with its attached muscle lever, was then placed in a Harvard warmer containing 50 cc of Ringer-Dale solution, which was well oxygenated and maintained at about 38° C by means of an outer water-bath The jacket of the latter was a galvanized pail in the bottom of which was a hole to receive a rubber stopper A short glass tube was passed through this stopper and connected by means of a rubber tube to the muscle chamber The outer end of the glass tube was attached to a T-tube, one arm of which served as a washout for the chamber, the other being connected to a second T-tube The second arm of the latter led to the oxygen tank and the third to a reservoir of fresh saline kept at 38° C Thus, by regulating various screw clamps, the solution surrounding the muscle was kept well oxygenated and could be washed out and renewed with fresh, warm saline in a fraction of a minute The thread from the upper end of the uterine strip was attached to the short arm of a counterbalanced lever which recorded contractions by an upstroke of the writing point on a slowly moving kymograph drum

After obtaining a satisfactory normal tracing, free from spontaneous and erratic movements, the drug was added at the top of the chamber and away from the

strip by means of a graduated capillary pipette It was allowed to act for ten minutes or longer The preparation used was the official fluidextract prepared by Eli Lilly & Co containing 55 per cent of alcohol, control experiments being run with the evaporated fluidextract, with 55 per cent alcohol and with fluidextract of ergot (Lilly) The results with the evaporated preparation did not differ materially from those of the official one, while the tests with alcohol showed that this ingredient has little effect on the uterine strip The fluidextract of ergot caused the usual pronounced stimulation in all controls

The concentrations used were much higher than those which could be produced in the body If we assume that the average dose, 4 cc , be completely and rapidly absorbed, there would be about 1 17000 in the blood of an adult man In our experiments the concentrations employed were 1 1000 and 1 500

Out of a total of ten experiments using a dilution of 1 1000, rate and amplitude were increased in one and remained constant in nine The tonus was raised in two and was unchanged in eight In the three cases the rises were very small Out of nineteen experiments using the dilution 1 500, the rate was raised in five and lowered in two and the amplitude and tonus were increased in five and decreased in three Each change, however, was relatively insignificant, being in no case more than a small fraction of the alterations produced by ergot We may justifiably conclude that even very high concentrations of senecio have no action on the excised uterus

Intact Uterus —Since it is impossible to simulate outside the body the conditions which are so rigidly controlled inside the organism, the preceding experiments on excised tissue do not represent the normal effect of the drug The mode of administration and absorption of the drug, temperature control and oxygen supply and consumption are necessarily greatly changed when the organ is removed The injury involved in severing the organ from the body and from the nervous mechanism supplying it is a factor not met in studying the activity in the intact animal

The method of investigation was that of Barbour (1), using fully grown, non-pregnant cats About one hour was allowed to elapse after the operation had been completed and the apparatus had been adjusted, in order to afford sufficient time for the establishment of regular uterine movements, which were in all cases small After obtaining a satisfactory record of the normal contractions, the fluidextract was injected in doses of 0 5 cc through the cannula in the left jugular vein A control injection of 0 5 cc of fluidextract of ergot was made at the end of each experiment In all, five experiments were performed using as many animals In each fluidextract of senecio failed to change the character of the uterine movements in any respect, while fluidextract of ergot produced the characteristic stimulating action

CONCLUSIONS

Although senecio has been used in medicine for many years, chiefly in uterine disorders, we find no published evidence of any value The drug is official probably because of some considerable usage, but certainly this cannot be because of scientific proof Since immense doses of the drug give no demonstrable effects on animals, since local application to the uterus gives no action on the rate, amplitude or tone

of the uterine muscle, we are forced to the conclusion that the drug is valueless in the conditions for which it is prescribed We offer the suggestion that it be eliminated from our materia medica As long as certain physicians prescribe it, deletion from the formulary may not be deemed advisable, but it would seem logical to urge strongly abandonment of any administration

SUMMARY

A proximate analysis of senecio was made, including moisture, ash, tannins, resins, etc There was found 0 1 per cent of volatile oil whose constants are given, also about 8 per cent of inulin and no starch No evidence could be found for the presence of alkaloids or glucosides

Even with enormous doses, senecio caused no untoward effects in rats or rabbits Numerous experiments on isolated uterine muscle and on normal uterine movements in intact animals clearly demonstrated the absence of any effect on the tone, rate or amplitude of this muscle

REFERENCES

(1) Barbour *J Pharmacol and Exp Therap*, 7 (1915), 547
(2) Pilcher *Ibid*, 8 (1916), 110–111
(3) Kelly and Lynn, Jour A Ph A, 20 (1931), 755–759
(4) Manske *Can J Research* 5 (1931) 651–659

THE ASSAY OF CAFFEINE SODIO SALICYLATE AND ELIXIR OF SODIUM SALICYLATE

BY EDWARD M HOSHALL, DONALD C GROVE AND GLENN L JENKINS

CAFFEINE SODIO-SALICYLATE

This preparation has been recommended for admission into the National Formulary VI A method of assay is proposed

Assay for Caffeine —Transfer 2 0 Gm of caffeine sodio salicylate, previously dried to constant weight at 80° C, and accurately weighed, to a 100 cc volumetric flask and make to volume with distilled water Transfer a 10 cc aliquot to a separatory funnel, add 5 cc sodium hydroxide T S and extract the caffeine with successive portions of chloroform until the residue gives no test for alkaloids with iodine (T S) Pass the chloroform solutions through a filter which has previously been moistened with chloroform and wash the stem of the funnel and filter with a few cc of the solvent to remove any adhering caffeine Evaporate the combined chloroform solutions on a water bath, and dry the residue of anhydrous caffeine to constant weight at 80° C

Assay for Sodium Salicylate —Transfer the aqueous liquid from which the caffeine has been removed by the above assay for caffeine to a 500 cc glass stoppered Erlenmeyer flask rinsing the separatory funnel with small portions of distilled water Also wash the filter and funnel used in the caffeine determination with small portions of water adding the washings to the 500-cc flask Add sufficient distilled water to make the volume in the flask about 100 cc Add 50 cc 0 1*N* Bromine solution, 10 cc of hydrochloric acid, then stopper and shake for one minute, then at intervals for thirty minutes Add 10 cc of 15 per cent potassium iodide solution, stopper and shake for five minutes Titrate the liberated iodine with 0 1*N* sodium thiosulphate solution, using starch T S as indicator

Each cc of 0 1*N* bromine is equivalent to 0 002668 Gm $NaC\ H_5O_3$

Experimental —According to National Formulary VI *Bulletin*, page 325 the formula and

directions for the preparation of caffeine sodio salicylate will be the same in the National Formulary VI, as they now are in the National Formulary V Due to the efflorescent nature of hydrated caffeine, the water content will be extremely variable as shown by W W White [1] Because of this fact it is recommended that the stable anhydrous caffeine (dried at 80° C) be used for this preparation

Accordingly the preparation was compounded by following the method as in the National Formulary *Bulletin*, page 525, substituting caffeine dried to constant weight at 80° C , for the hydrated caffeine The same sodium salicylate as used in the elixir of sodium salicylate was used The analysis appears in Table II

The preparation was then assayed by the method given above, with the following results

TABLE I

	Analyst	Amount Present Per Cent	Amount Found Per Cent.		Error Per Cent
Sodium Salicylate	A	49 82	49 71	49 74	−0 2
	B	49 82	49 64	49 67	−0 2
Caffeine (dried at 80° C)	A	50 00	50 01	49 79	−0 2
	B	50 00	49 84	49 77	−0 4

CONCLUSION

1 Suitable methods of assay for caffeine sodio-salicylate have been developed It is recommended that the assay be adopted as official in the National Formulary VI

2 It is recommended that caffeine (dried to constant weight at 80° C), be substituted for caffeine hydrated, in this preparation

3 It is recommended that the following tolerances be adopted

The preparation shall contain not less than 47 5 per cent or more than 52 5 per cent of sodium salicylate

The preparation shall contain not less than 47 5 per cent or more than 52 5 per cent of caffeine dried to constant weight at 80° C

ELIXIR SODIUM SALICYLATE

This preparation has been recommended for admission into the National Formulary VI A method of assay is proposed

Assay for Sodium Salicylate —Transfer 10 cc of the preparation to a 250 cc volumetric flask and make to volume with distilled water Transfer a 10 cc aliquot to a 500-cc glass stoppered Erlenmeyer flask, add 100 cc of distilled water, 50 cc of 0 1*N* bromine solution and 10 cc of hydrochloric acid Stopper and shake for one minute, then at intervals for thirty minutes Add 10 cc of 15 per cent potassium iodide solution, stopper and shake for 5 minutes Titrate the liberated iodine with 0 1*N* sodium thiosulphate solution, using starch T S as indicator

Each cc of 0 1*N* bromine = $(0\ 002668 \times \frac{250}{10} \times 10) = 0\ 667$ Gm NaC H_5O_3 per 100 cc of solution

Experimental —Sodium salicylate (a C P quality salt), was assayed by the above method, and also by the extraction and determination of the salicylic acid content The results are given in the following table

TABLE II

	Analyst	Assay by Proposed Method Per Cent		Assay by Determination of Salicylic Acid Per Cent.	
Sodium Salicylate	A	99 62	99 62	99 65	99 38
	B	99 76	99 52	99 66	99 57
	Average	99 63%		99 57%	

[1] U S P XI Circulars, General Committee, page 170

Using the assayed salt and following the method of preparation of Elixir Sodium Salicylate as in the National Formulary VI *Bulletin*, the product was compounded and assayed by the method as presented above The results appear in Table III

TABLE III

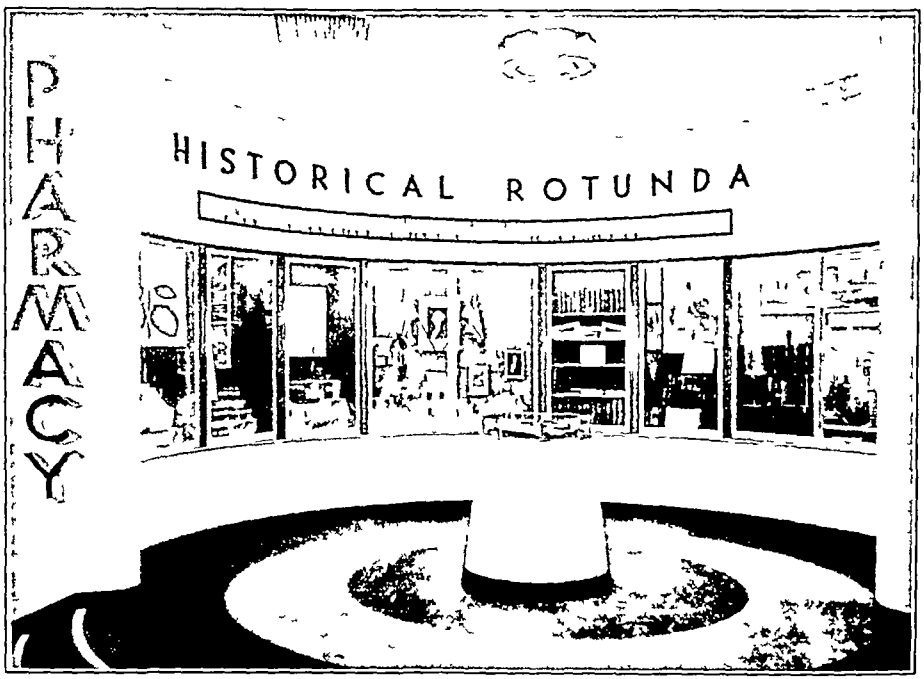
	Analyst	Amount Present Gm /100 cc	Amount Found Gm /100 cc	Error Per Cent
Sodium Salicylate	A		24 77	−0 6
		24 908	24 75	
	B		24 73	−0 6
			24 74	

CONCLUSIONS

1 A suitable method of assay for Elixir of Sodium Salicylate has been developed It is recommended that the method of assay herein proposed be adopted as official in the National Formulary VI

2 It is recommended that the following tolerance be adopted for this preparation 100 cc of Elixir of Sodium Salicylate contains not less than 24 5 Gm or more than 25 5 Gm of sodium salicylate

---



The Pharmacy Exhibit at the Century of Progress will probably be continued this year Editorial comment is made in this issue of the JOURNAL

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

PHARMACOPŒIAS AND FORMULARIES

Anon
British Pharmaceutical Codex formulæ
Pharm J 131 (1933), 764
Anon
British Pharmaceutical Codex 1934 Pharmacognosy, action and uses, and pharmacy reports
Pharm J , 132 (1934), 4
Kremers, Edward
The first modern Pharmacopœia
JOUR A PH A , 23 (1934) 46

APPARATUS AND MANIPULATIONS

Huss Harald
Directions for sterilization prescribed by the Danish and Swedish Pharmacopœia
Farm Revy, 33 (1934), 17, 29
Jones, B A
An automatic, modified falling-sphere viscometer
Ind Eng Chem , 6 (1934), 80
Knapp, Robert T
New apparatus for determination of size distribution of particles in fine powders
Ind Eng Chem , 6 (1934) 66

PHARMACEUTICAL PREPARATIONS

Anon
Pills and tablets for intestinal medication
Pharm J , 132 (1934), 10
Albertus, Halvar
Laboratory notes on pharmaceutical preparations
Farm Revy , 32 (1933), 705 721, 733 759
Bohm, E
Preservatives in cosmetics
J Soc Chem Ind , 52 (1933), 1083
Bower, S Walley
Variations in hand-molded hypodermic tablets
JOUR A PH A , 23 (1934), 36
Carr, C Jelleff, and Krantz, John C , Jr
A study of the hydrogen-ion concentration of tincture of digitalis, tincture of aconite and fluidextract of ergot
JOUR A PH A , 23 (1934), 50
Cocking, T Tusting
The alcoholic strength of Ext Senegæ Liq B P
Pharm J , 131 (1933) 766
Duncan R A
The new detergents
Ind Eng Chem , 26 (1934), 24
Jensen, V , and Ørner, H
Use of different substances for preserving medicines
J Soc Chem Ind , 53 (1934), 43
Jurist A E , and Christiansen, W G
Electrolysis of sodium iodobismuthite solutions
JOUR A PH A 23 (1934) 15
Laboratory of E Holdermann Sohne
Viscosity of tinctures
Pharm Ztg , 79 (1934), 10
Regnier, Jean, and David, Robert
Influence of hydrogen-ion concentration on the stability of saline solutions of cocaine hydrochloride
Bull sci pharmacol , 40 (1933), 650

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Beaune, A , and Balaceanu, V
Action of some heart tonics on the isolated ventricle of the snail
Bull sci pharmacol , 40 (1933), 658
Berkley, Hugh K
Argyria
J A M A , 102 (1934), 202
Brem, Jacob, and Leopold, Jerome S
Ovarian therapy
J A M A , 102 (1934), 200
Brown Ernest W , and Scott, W O
The absorption of methyl salicylate by the human skin
J Pharmacol & Exper Therap , 50 (1934), 32
Cannon, A Benson
Value of silver arsphenamine in the treatment of early syphilis
J A M A 102 (1934), 268
Chopra R N , and Mukherjee, B
Toxic effects of ephedrine
Pharm J , 132 (1934) 38

Grabfield G P , and Gray, M G
The action of cinchophen on the nitrogen metabolism
J Pharmacol & Exper Therap , 50 (1934), 28
Hurd, L C Colehour J K , and Cohen, P P
Toxicity tests with rhenium
Pharm J , 132 (1934) 38
Knoefel, P K
Narcotic potency of the aliphatic acyclic acetals
J Pharmacol & Exper Therap 50 (1934), 88
Leake C D
The role of pharmacology in the development of ideal anesthesia
J A M A , 102 (1934), 1
Macht David I , and Davis, Mary E
Toxicity of alpha- and beta-nicotines and normicotines An inquiry into chemopharmacodynamic relationships
J Pharmacol & Exper Therap , 50 (1934) 93
Munch James C Byers George E and Pratt Harry J
Organoleptic bioassays
Jour A Ph A 23 (1934) 24
Nakarai, S , and Sano, T
Toxicological investigation of the toxic constituents of Ryania acuminata
Arch Pharm 272 (1934), 1
Reinhold, J G *et al*
The effects of glycine (glycocoll) in muscular dystrophy
J A M A , 102 (1934), 261
Rosenthal, S M , and Probey, T F
Relation of arsenoxide content to toxicity of fresh and old samples of arsphenamine
J Soc Chem Ind , 53 (1934), 43
von Oettingen, W F , and Marshall, I H
Comparison of the pharmacologic action of atropine and its optical isomers, levo- and dextro-hyoscyamine
J Pharmacol & Exper Therap , 50 (1934), 15
Ward, R A
The pharmacological action of the alkaloids of fumariaceous plants I Isocrydine
J Pharmacol & Exper Therap , 50 (1934), 100
Zwikker, J J L
Action of calomel on alkaloidal salts A toxicological investigation
Pharm Weekbl , 71 (1934) 22

BOTANY AND PHARMACOGNOSY

Beal, George D , and Szalkowski Chester R
Detection of gelatin in agar
Jour A Ph A 23 (1934), 22
Edman, Gösta
Picrasma and quassia woods
Farm Revy , 33 (1934) 32
Juul, K
Pharmacognostic notes on the Danish Pharmacopœia, 1933
Arch Pharm og Chem , 41 (1934), 4
Paine, H S , Gertler, S I , and Lothrop, R E
Colloidal constitutents of honey
Ind Eng Chem , 26 (1934), 73
Sievers, R Jaretzky
Microsublimate from ononidis root
Pharm Zentralh , 75 (1934), 16

ALKALOIDS AND GLUCOSIDES

Bossert, Roy G , and Brode, Wallace R
A synthesis of pseudoephedrine
J Am Chem Soc , 56 (1934), 165
Couch, James Fitton
Lupine studies VI The alkaloids of Lupinus Corymbosus, Heller Part I
J Am Chem Soc , 56 (1934), 155
Goris, A , and Chalmeta C
Observations on the estimation of ecgonine
Bull sci pharmacol , 40 (1933), 641
Howard, Bernard F
Cinchona and civilization
Pharm J , 131 (1933) 742 765
Mannich, C
Glucosides of Digitalis lanata
Arch Pharm , 272 (1934) 5
Pollard, C B , and Adelson, David L
Derivatives of piperazine
J Am Chem Soc , 56 (1934) 150

ESSENTIAL OILS

Anon
Some South African essential oils Eucalyptus dives, Stoebe, and buchu oils
Perf & Ess Oil Rec , 24 (1933), 421
Bournot, Konrad
New studies in the field of essential oils, especially those reported from 1930 to the end of 1932
Arch Pharm , 272 (1934), 23
Freise, Fred W
Odoriferous woods from the Brazilian virgin forest II
Perf & Ess Oil Rec , 24 (1933) 410
Huerre, R
4-Iodine values of essential oils
J Soc Chem Ind , 53 (1934) 43
Jermstad, Axel and Ostby, Ottar
Norwegian caroway oil
Pharm Zentralh , 75 (1934), 33
Sabetay, S
Colour reaction of geranium oil and commercial rhodinol
J Soc Chem Ind , 52 (1933) 1084

Wasicky R , Rotter, G , and Alber, T
Determination of essential oils in drugs and plant materials
J Soc Chem Ind , 53 (1934), 43

OILS FATS AND WAXES

François M T and Droit, S
Composition of the oil from the physic nut, Jatropha curcas, L
J Soc Chem Ind , 52 (1933), 1066
Schuster, G
Determination of the index of azelaic acidity of cacao butter
J pharm chim , 18 (1933), 527
Van Beneden Georges
Analytical study of the edible fatty acids Part I Cacao fat
J pharm Belg , 16 (1934), 1, 17, 37

ANALYTICAL METHODS AND RESULTS

Damerell, V R and Strater, H H
New volumetric method for determination of sulfate
Ind Eng Chem , 6 (1934), 19
Ekkert, Lad
Contribution to the knowledge on the reaction between some phenols and antimony pentachloride
Pharm Zentralh , 75 (1934) 50
Ekkert Lad
Reactions of some phenols with arsenic sulphide
Pharm Zentralh , 75 (1934) 50
Fabre, R , and Brard, D
Estimation of alcohol in chloroform for anesthesia
J pharm chim , 19 (1934), 5
Glomaud, Georges
Micro determination of magnesium with *o*-oxyquinoleine
J pharm chim , 19 (1934), 15
Hartmann, C
Determination of diastase in Danish honeys
Dansk Tids Farm , 8 (1934) 1
Hunter, L and Hyde F F
New reagent for determination of iodine values
J Soc Chem Ind 52 (1933) 1065
Kädıng Hand
New uses of radioactivity
Arch Pharm 272 (1934), 38
Koszegi D
Colorimetric method for following the diminution in free phosphorous content of phosphorous pills
Pharm Zentralh , 75 (1934), 34
Leavell, Gladys, and Ellis, N R
Determination of iron
Ind Eng Chem , 6 (1934), 46
Lucas A
Beam's colour test for hashish
J Soc Chem Ind 52 (1933), 1083
Radley, J A
Flourescence analysis of pharmaceutical products
Chem & Drug , 119 (1933), 768
Ralls, J O
A micro method for the determination of iodine numbers
J Am Chem Soc , 56 (1934), 121
Ritsema, I C
Reactions for distinguishing between red and yellow oxides of mercury
Pharm Weekbl 71 (1934), 58
Smith, O M , and Dutcher, Harris A
Colorimetric determination of fluorine
Ind Eng Chem 6 (1934), 61
Ware, Alan H
Use of resorcinol in chemical analysis
Chem & Drug 120 (1934) 74

ORGANIC CHEMICALS

Beal, George D and Szalkowski, Chester R
A reaction for phenobarbital
Jour A Ph A 23 (1934) 18
Bordeianu, C V
Aristol and the preparation of iodophenols
Arch Pharm 272 (1934), 8
Bryant, A P
The terminology of sugars
Ind Eng Chem , 26 (1934), 231
Caldwell A Lee and Bibbins Francis E
Oxidation and antioxidants
Jour. A Ph A 23 (1934), 7
Davis, Tenney L , and Harrington, Valentine F
The pseudo-quinoid character of tribromoresorcinol
J Am Chem Soc 56 (1934), 129
Rybacek L
Effect of sodium perborate on glycerol
J Soc Chem Ind 52 (1933), 1083
Tschentke Herman L
Chemical examination of trichloroethylene for anesthesia
Ind Eng Chem 6 (1934), 21

AROMATIC ELIXIR *

BY L D HAVENHILL AND M G SMOLT

Aromatic Elixir, U S P X is an excellent vehicle and masking agent, one of the best in use to-day The junior author became interested in the study of this vehicle when large quantities of it were required by the Bell Memorial Hospital in Kansas City, Kansas, and the Watkins Memorial Hospital in Lawrence, Kansas

The difficulty in preparing this elixir is to secure a clear product The official process is long and tedious and often disappointing to the busy hospital pharmacist Several writers, Shiflett (1), Silver (2) and Burlage (3) and others have given the matter of a rapid method of preparing this elixir considerable attention, but their methods in our hands have not been entirely satisfactory

The volatile oils used in the preparation of the Compound Spirit of Orange from which the Elixir is prepared are shown in Gildemeister and Hoffman (5) to consist, with the exception of Oil of Anise, largely of terpenes which are not readily soluble in a dilute alcohol These are almost completely precipitated in the preparation of the elixir and are the chief cause of the difficulties encountered

The oxygenated principles of these oils are the desirable ones They are also not the ones which cause the cloudiness The problem resolves itself into the following

First to determine a strength of alcohol that can be used in preparing Compound Spirit of Orange that will extract sufficient oxygenated principles from the volatile oils used, but not enough of the terpenes to precipitate on dilution when preparing the aromatic elixir

Second to establish the strength of this new spirit as compared with the one now official regarding oxygenated principles

Third to ascertain the relative amounts of oxygenated principles present in Aromatic Elixir

Fourth to calculate the amount of this 'soluble Spirit necessary to make an Elixir similar in flavoring strength to the one at present official

A search through the literature yielded very little of value The articles for the most part were concerned with improving the methods of filtering or with changing the proportions of ingredients used Krantz and Carr (6) (7), in two articles recorded results using filtering agents other than talc In actual experience talc has been found to be the most satisfactory filtering medium

It is reasonable to expect that if a mixture of volatile oils is added to a diluted alcohol, two phases will result Since the mixture of oils contains oxygenated principles which are also soluble in the diluted alcohol used, an equilibrium will be established in the aldehyde strength of the two immiscible liquids The amount of oxygenated principles present in the alcoholic phase will depend on both the volume of the solution and the strength of alcohol used The amount of oxygenated principles remaining in the oil phase is lost in all methods of preparation because this phase is removed through filtration

Shiflett (1) and Silver (2) claim the products obtained by their methods are identical in strength with Aromatic Elixir, U S P because the same amounts of ingredients have been used, although both processes involve a preliminary pre-

* Section on Practical Pharmacy and Dispensing, Madison meeting 1933

cipitation of the hydrocarbon principles of the volatile oils, which are filtered out before adding the remainder of the ingredients This would lead one to think that the "order of mixing" made no difference in the strength of the finished product

Experiments were carried out which showed that the amount of oxygenated principles removed by the alcoholic liquid varies considerably with the procedure used It would seem essential, therefore, when suggesting modifications of the official process, that the quantity of oxygenated principles in the finished elixir be comparable to that in the official elixir This can only be done by assay Extensive experiments were made in an effort to get a "soluble" Compound Spirit of Orange

The method used follows

Varying amounts of Compound Spirit of Orange were introduced into a 50 cc volumetric flask and diluted to the mark with distilled water Each portion was then filtered, using talc, and portions of the filtrate used in compounding small amounts of aromatic elixir It was found that if 32 cc of Compound Spirit of Orange U S P be diluted with distilled water to 50 cc , the resulting mixture thoroughly shaken and filtered, using 10 Gm of talc, portions of the filtrate could be compounded into Aromatic Elixir giving a clear product of superior fragrance and taste, which does not require a final filtration The entire operation of compounding, using the "soluble" Compound Spirit of Orange, takes less than 5 minutes

The next step was to ascertain the strength of the oxygenated principles of the filtrate as compared with the original spirit

The method of aldehyde assay proposed by Gfeller (4) was rejected because the terpene constituents are determined as well as the oxygenated principles The method of Klebler (5) with several variations was tried and rejected because of the difficulty in securing a definite end-point in the residual titration The colorimetric methods of the A O A C (8) were also tried The sulphite-fuchsin method was rejected because the alcohol used gave a color varying with the strength of the alcohol The method using *M*-phenylene-diamine proved to be suitable and the following modification was used throughout in the subsequent determinations

Freshly prepared alcoholic solutions of *M*-phenylene-diamine hydrochloride produce no color with the minute amount of aldehydes present in ethyl alcohol (This reagent must be freshly prepared, for in a few hours it becomes badly discolored and is unfit for use) The method of comparison used was to pipette 10 cc of the alcoholic solution to be tested into a 25-cc volumetric flask and dilute to the mark with a one per cent alcoholic solution of *M*-phenylene-diamine hydrochloride The color developed was compared, using a colorimeter, with a standard solution similarly prepared To compare the amount of oxygenated principles in the Compound Spirit of Orange used, with that present in the aromatic elixir made from it, the following method was used

One and two-tenths cc of Compound Spirit of Orange were diluted to 100 cc with 95% alcohol Another portion of 1 2 cc of Compound Spirit of Orange with enough alcohol added to make 25 cc , was diluted to 100 cc with water (Procedure of the U S P X for Aromatic Elixir, minus the syrup which would cause complications with the aldehyde reagent It is believed that the presence of sugar does not materially affect the solubility of the oxygenated principles of the volatile oils) Talc was then added and the product filtered The aldehyde strengths of the two solutions were then compared by the method given Comparison was also made of the aldehyde strength of the Compound Spirit of Orange of the U S P X and the

Soluble Compound Spirit of Orange Since the amount of the Soluble Compound Spirit of Orange used in making the elixir is the amount present in the finished product, as none is lost by filtration, the volume of the "soluble" Compound Spirit of Orange required will be that which contains the same amount of oxygenated principles as is found in 1 liter of Aromatic Elixir, U S P X Careful comparisons showed that the approximately 25% alcohol dilution of the Compound Spirit of Orange, representing Aromatic Elixir, retained but 44% of the aldehyde strength of the Compound Spirit of Orange used, and that the "soluble" Compound Spirit of Orange had an aldehyde content of but 33% of that of the Compound Spirit of Orange By simple calculation it is evident that approximately 16 cc per liter of the soluble Compound Spirit of Orange must be used to duplicate the aldehyde strength of the present official aromatic elixir

The following formulas are offered for preparing a "soluble" Compound Spirit of Orange from the official spirit, for use in making aromatic elixir

SOLUBLE COMPOUND SPIRIT OF ORANGE

Compound Spirit of Orange U S P X	640 cc
Talc	30 Gm
Distilled water	365 cc

Mix the liquids in a large separatory funnel Shake thoroughly and allow to stand one half hour Draw off the cloudy lower liquid, thoroughly mix it with the talc and filter in the approved manner to secure a clear filtrate and to restrict evaporation

If the use of the oils is preferred to the Compound Spirit of Orange, the following formula is suggested for making the "soluble" Compound Spirit of Orange

SOLUBLE COMPOUND SPIRIT OF ORANGE

Oil of Orange	128 cc
Oil of Lemon	32 cc
Oil of Coriander	12 8 cc
Oil of Anise	3 2 cc
Alcohol	465 cc
Water	370 cc
Talc	30 Gm
To make about	750 cc of "soluble" Compound Spirit of Orange

Mix the liquids thoroughly in a separatory funnel of suitable size Allow to stand for one half hour Draw off the cloudy lower liquid, mix it with the talc and filter in the approved manner to secure a clear filtrate and to restrict evaporation

The chief use of Compound Spirit of Orange is for preparing Aromatic Elixir In a few instances it is used in prescription compounding for flavoring It is believed that this "soluble" compound spirit of orange will prove to be an unobjectionable substitute and much more suitable for use in flavoring medicinals which are low in alcoholic strength

The following formula is offered for an aromatic elixir which meets the U S P X requirements, using the "soluble" Compound Spirit of Orange

AROMATIC ELIXIR

Compound Spirit of Orange, soluble	16 cc
Syrup	375 cc
Alcohol	250 cc
Distilled water	380 cc
To make about	1000 cc

Mix the soluble compound spirit of orange with the alcohol Add the syrup in small portions, mixing well after each addition, then in like manner add the distilled water (The product at this stage is full of minute bubbles, but clears in a few minutes)

BIBLIOGRAPHY

(1), (2) *Practical Druggist*, 48 (March 1930), 17, 48 (April 1930) 37
(3) *Ibid*, 50 (October 1932), page 16
(4) *Chemical Abstracts*, 24 (1930), 5936
(5) "The Volatile Oils, Gildemeister and Hoffmann," 2nd Edition by E Gildemeister, translated by Edward Kremers
(6) JOUR A PH A 19 (1930), 1095
(7) *Ibid*, 20 (1931), 784
(8) "Method of Analysis " Association of Official Agricultural Chemists, 2nd Edition

A STUDY OF VEHICLES FOR MEDICINES *

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

III ELIXIR OF PHENOBARBITAL

If the slogan "Every N F preparation a pharmaceutic masterpiece" be adopted, it ought to add immeasurably to the prestige and popularity of its formulas with the medical profession It may take quite some time to rectify the errors of omission in this respect in the old formulas of this Book, many of which, all will agree, could be improved We should, however, scrutinize all new formulas that seek admission to this publication from that standpoint Without pretending to crown the formula we are about to propose as "a masterpiece,"—it is not for us to pronounce it as such—we would like to submit it in competition with other formulas for consideration, most especially, from the standpoint of palatability

The principle underlying the elaboration of this formula is best illustrated by the following experiment

1 0 030 Gm of Phenobarbital dissolved in 15 cc of alcohol (95%)
2 0 030 Gm of Phenobarbital dissolved in 15 cc of dilute alcohol (50%)
3 0 030 Gm of Phenobarbital dissolved in 15 cc of 25% alcohol

It will be found that the taste of Solution 3 is much more bitter than that of Solutions 2 and 1 Of course, Solution 1 is unpleasantly strong in alcohol, and, therefore, one does not hesitate in deciding that Solution 2 gives the best result The reason for the lower degree of bitterness of the stronger alcoholic solution over the weaker, evidently lies in the physical fact that *a substance will not exchange a good solvent for a poor solvent* Inasmuch as phenobarbital is so much more soluble

* From the Laboratory of Pharmacology of the University of Illinois

alcohol than in water, the 50% alcohol is a much better solvent than is the 25% alcohol and the saliva-saturated mucosa of the tongue and palate is a still poorer solvent If one desires to test in this case, the validity of the proposition that "*the best solvent is the best vehicle*" all one needs to do is to dilute the solution resulting from Experiment 2 with water, which immediately brings out a great bitterness Therefore, when the dose is given in this way, it should not be diluted with water

We secured a rather "delicious" preparation, tasting more like a "liqueur" than medicine, by dissolving a 0 015 Gm dose of phenobarbital per teaspoonful of 2 parts of "aqueous elixir" to 1 part of "alcoholic elixir " This mixture of solvent would carry even 0 03 Gm per teaspoonful, but the resulting solution becomes quite bitter It might be prepared extemporaneously by dissolving the active agent in a mixture of aqueous and alcoholic elixirs, the formulas for which have been previously submitted (article II of this series) It might seem best, however, to present the following formula for its direct preparation

ELIXIR PHENOBARBITAL

Elixir of Phenobarbital

Elix Phenobarb

Phenobarbital	3 75 Gm
Gluside	1 5 Gm
Compound Spirit of Orange	7 0 cc
Alcohol	300 0 cc
Glycerin	200 0 cc
Water	410 0 cc
Sucrose	170 0 Gm
Tincture of Cudbear	6 0 cc

Add the compound spirit of orange to the previously mixed solvents Agitate and permit to stand for 24 hours, with occasional agitation Filter through a hard filter and dissolve the phenobarbital, gluside and tincture of cudbear in the filtrate and finally the sucrose either by solution or percolation and add enough of the mixed solvents to make the product measure 1000 cc

CONCLUSIONS

1 An elixir of phenobarbital should be of rather high alcoholic strength, approximately 30%

2 The dose should not be diluted before taking, as dilution brings out the bitterness

3 A formula is offered for comparison with others submitted

4 If the formula be adopted, it might be prepared either directly as stated, or else indirectly by dissolving the required dose in a mixture of 2 parts of the "aqueous" to 1 part of the "alcoholic elixir," the formulas for which have been previously submitted

IV — ELIXIR OF AMIDOPYRINE

In constructing a formula for an Elixir of Amidopyrine that might be as palatable as possible, we have tried the following vehicles, dissolving 0 150 Gm ($2^1/_2$ gr) of amidopyrine per teaspoonful, which is one-half of the official average dose

Aromatic Elixir
Iso alcoholic Elixir, 50%
Compound Elixir of Taraxacum
Elixir of Glycyrrhiza
Elixir Bitter Almond Comp —made with 50% alcohol
An Alkaline Elixir of Eriodictyon—made with 50% alcohol
Syrup of Glycyrrhiza
Aromatic Syrup of Eriodictyon

In comparing the tastes of these preparations it seems evident to us that the alcoholic vehicles are better than the aqueous vehicles, and that the stronger alcoholic vehicles are superior to those weaker in alcohol This is as might be expected from the fact that the amidopyrine is much more soluble in alcohol than in water, and it might serve as another illustration of the proposition that "the best solvent is the best vehicle "

In comparing elixirs of analogous alcohol concentration, we find that an alkaline elixir of eriodictyon made with 50% alcohol provides by far the best disguise, subduing the bitterness to a greater extent than any of the others That this is not merely due to solvent power is evidenced from the fact that the bitterness is not brought out by dilution, as does occur when the previously proposed Elixir of Phenobarbital (4th Communication) is diluted with water It must, therefore, be due to specific adsorption of the amidopyrine by the eriodictyon resin

We have proof, by test-tube experiments, that such adsorption actually occurs When we add 1 cc of fluidextract of eriodictyon to portions of 5 cc and 10 cc of a solution of 1 1000 of amidopyrine, we obtain a colloidal precipitate which is very difficult to remove from the liquid After clarification with dilute sulphuric acid, it is readily demonstrated by means of Mayer's Reagent that about nine-tenths of the amidopyrine has been taken out of solution We therefore know that eriodictyon resin combines with amidopyrine That this combination will be active in the system is made evident by the fact that the precipitate dissolves in *N*/100 HCl, which is about one-fifth the hydrochloric acid strength of the average gastric juice

We, therefore, respectfully submit the following formula for consideration for possible admission to the National Formulary

ELIXIR AMIDOPYRINÆ

Elixir of Amidopyrine

Elix Amidopyrin

Oil of Bitter Almond	0 5 cc
Vanillin	1 0 Gm
Gluside	1 5 Gm
Amidopyrine	37 5 Gm
Fluidextract of Eriodictyon	30 0 cc
Solution of Potassium Hydroxide	27 5 cc
Alcohol	500 0 cc
Syrup	350 0 cc
Orange Flower Water, a sufficient quantity,	
To make	1000.0 cc

Dissolve the oil of bitter almond, the vanillin and the gluside in the alcohol, then add the syrup Mix Dissolve the amidopyrine in the above solution

Mix the fluidextract of eriodictyon and the potassium hydroxide solution, add it to the amidopyrine solution and mix Finally add enough orange flower water to make 1000 cc

The above given formula has been constructed with the N F Elixir of Bitter Almond as a basis, this having been selected because bitter almond is in itself a good disguise for the bitter taste We have fortified the elixir by the addition of fluidextract of eriodictyon because of its power of disguising alkaloids and similar bodies, such as amidopyrine The quantity of fluidextract of eriodictyon has been chosen at the maximum that will still be pleasant A greater proportion would develop the inherently unpleasant taste of the yerba santa to an offensive degree The addition of the potassium hydroxide is necessary to secure a clear solution

We believe that an elixir of the composition elaborated for the disguise of the amidopyrine might also be useful for other similar medicines We, therefore, would like to submit the following formula for consideration as a possibly useful strongly alcoholic vehicle for alkaloids

ELIXIR ERIODICTYI ALKALINUM

Alkaline Elixir of Eriodictyon

Elix Eriodict Alkal

Oil of Bitter Almond	0 5 cc
Vanillin	1 0 Gm
Gluside	1 5 Gm
Fluidextract of Eriodictyon	30 0 cc
Solution of Potassium Hydroxide	27 5 cc
Alcohol	500 0 cc
Syrup	350 0 cc
Orange Flower Water, a sufficient quantity	
To make	1000 0 cc

Dissolve the oil of bitter almond the vanillin and the gluside in the alcohol, then add the syrup Mix

Mix the fluidextract of eriodictyon and the potassium hydroxide solution and add to the above solution Finally, add enough orange flower water to make 1000 cc

In suggesting the desirability of introducing this elixir of eriodictyon, we would like to point out that we have not reversed our opinion regarding the desirability of deleting the now official elixir We recommend this deletion because the "Aromatic Elixir of Eriodictyon" is practically not prescribed at all It is a most unstable preparation in that it precipitates continually It is an irrational preparation in that a considerable and undeterminable proportion of the active disguising principle of eriodictyon, the resin, is unceremoniously filtered out It also suffers from a redundancy of ingredients, containing as many as thirteen, several of them without any good and sufficient reason or advantage We found that the official elixir contains neither enough alcohol nor of the resin of eriodictyon to give nearly as satisfactory a result in disguising of amidopyrine as the above

proposed elixir, for which the name "Alkaline Elixir of Eriodictyon" might be suggested in order to distinguish it from the elixir at present official

CONCLUSIONS

1 An elixir of amidopyrine should be a strongly alcoholic elixir, about 50%, because amidopyrine is more soluble in alcohol than in water

2 The presence of eriodictyon resin in alkaline solution greatly increases, by adsorption of the amidopyrine, the disguising power of an elixir intended to carry it

3 An elixir of eriodictyon which serves so admirably as a vehicle for this alkaloid-like body, might also be useful as a vehicle for other similar agents, and its consideration for possible inclusion in the National Formulary, under the title "Alkaline Elixir of Eriodictyon," is suggested

---

THE NEW YORK STATE PHARMACY SYLLABUS *

BY C W BALLARD, PHAR D , PH D

The Pharmacy Law of New York State provides for the granting of four degrees in pharmacy The graduate in pharmacy, Ph G , is conferred upon the completion of a three-year course with a minimum of 750 hours yearly, the pharmaceutical chemist, Ph Ch , a three-year course of 1000 hours yearly, the bachelor of science in pharmacy, B S Phar , was originally a four-year course of 1000 hours yearly but is now on a semester-hour basis with a minimum of 3600 clock hours, the doctor of pharmacy, Phar D , representing two years of graduate study subsequent to the attainment of the bachelor's degree Graduates of both three-year courses are eligible for licensing before the Board of Pharmacy

The recently issued Pharmaceutical Syllabus IV contemplates a four-year course and is manifestly not applicable to a course of three years' duration In view of this situation the New York State Education Department has prepared a three-year schedule and syllabus which represents a modification of the Pharmaceutical Syllabus IV The four-year course, in operation for several years in New York State, is retained and the National Syllabus might have been adopted for this course if it had fulfilled the requirements of the Education Department for the bachelor's degree The specifications adopted for this four-year course may be briefly stated as follows 1 It must include all the subjects and hour allotments of the three-year course, 2 It must include a minimum of 3600 clock hours instruction over four calendar years, 3 The division of subjects shall approximately represent fifty per cent each of professional and nonprofessional work, 4 The course shall extend over five days weekly in each calendar year These requirements, especially the second, necessitated the preparation of a statement of the hours and subjects to be required in both the three- and four-year courses This syllabus

* Section on Education and Legislation A PH A Madison meeting, 1933

has now been published and will presumably be in effect with classes entering in September 1933

There are naturally many points of similarity in the two syllabi and the major points of difference are due to the specifications previously mentioned The New York Syllabus adopts three primary divisions of subjects—professional, required academic and required electives as contrasted with the professional or applied and basic groups of the National Syllabus Certain subjects included in the basic group of the National Syllabus and therefore without detailed statements of the content of the course, are considered as professional subjects in the New York Syllabus and teaching outlines are provided The subjects are botany, physiology and first aid and elementary physics together with general, inorganic, qualitative, quantitative and organic chemistry In the New York Syllabus there is a frequent grouping or bulking of time for several related subjects thereby permitting the instructor to apportion the time for each as he sees fit Every subject listed in the New York Syllabus is required but in the history and elective science groups maximum and minimum limits are stated In the New York Syllabus the requirements are stated in terms of didactic, laboratory and semester hours excepting in zoology, college physics, bacteriology and elective science which are stated in terms of semester hours or points As regards total time for the courses, the National Syllabus provides for a four-year course with a minimum of 3000 hours, 2336 of required subjects and 664 of optional subjects while the New York Syllabus for the corresponding course requires a minimum of 168 5 semester hours and states a maximum of 183 5 semester hours Obviously the conversion of semester hours to clock hours depends upon the amounts of didactic and laboratory instruction, but the minimum of 168 5 semester hours is to be equivalent to 3600 clock hours

The requirements of these two Syllabi, as regards subjects and time allotments, are presented in the following tabulation It has not been possible to follow the arrangement of either syllabus in compiling this data but it will serve for general purposes of comparison

	National Syllabus				New York Syllabus			
Subjects	Didactic	Laboratory	Sem Hours		Didactic	Laboratory		Sem Hours
Commercial Group								
Accounting	32	64	O	4				
Economics	96		R	6				
Jurisprudence	32		R	2	80	64	*R	7
Medical Appliances								
Merchandising	64	64	O	6				
Pharmacy Group								
Arithmetic	32		R	2	64		*R	4
Dispensing	64	128	R	8				
Manufacturing		96	O	3		352	*R	11
Operative	64	128	R	8				
History	32		R	2				
Technic		64	R	2				
Theory	192		R	12	320		*R	20
Latin	32		R	2	32		*R	2

Chemistry Group								
General	48	64	R	5				
Inorganic	32	64	O	4	192			
Qualitative	48	64	R	5				
Quantitative	32–48	64	R	4–5	64	336	*R	32 5
Organic	96	128	R	10	96			
Pharm Organic	48	64	O	5				
Biochemistry	48	64	O	5				
Pharmacology Group								
Pharmacology or Materia Medica including Toxicology, Posology	96	32	R	7				
Microbiology					272	96	*R	20
Pharmacognosy Macro	64	64	R	6				
Pharmacognosy Micro	16	64	O	3				
Bioassaying	16	48	O	2 5				
Insecticides	32		O	2				
Public Health	48		R	3				
Allied Science Group								
Bacteriology	32	64	R	4			R	3
Botany	64	64	R	6	64	96	*R	7
Physiology	48	48	R	4 5	80		*R	5
Physics	64	128	O	8	*64	128	R	8
Zoölogy	32	64	O	4			R	4
Elective courses in science							R	9–18
Academic Group								
English	96		R	6			R	12
Modern Language	96		O	6			R	12
History and Social Science							R	6–12
Mathematics	96		R	6			R	6
Total Required				111 5				168 5
Total Optional				52 5				15 0

R = required, O = optional, * = required in three-year course (110 5 hrs)

COLUMBIA UNIVERSITY,
COLLEGE OF PHARMACY

JOHN TENNENT AND SENECA RATTLESNAKE ROOT *

BY RALPH BIENFANG [1]

"Traduced, circumvented and at last betrayed bereft of every consolation, save that of conscious integrity, and a distant hope derived therefrom I take this method of submitting myself to the determination of the public, in confidence of

* Section on Historical Pharmacy, A PH A, Madison meeting, 1933

[1] From a thesis submitted in partial fulfilment of the requirements for the Ph D degree, Univ of Wisconsin, 1929

obtaining a sentence agreeable to its usual candour, and suitable to my own deservings, as they shall occur in the subsequent narrative "

Truly a sad statement, but one to be expected since the author was in jail, awaiting trial for bigamy It was written by John Tennent, discoverer of the use of Seneca rattlesnake root in the cure of pleurisy, as he sat behind bars in the Old Bailey in London in 1742 Jail was not new to Tennent at this time, but let us take up his life where we have the first notice of him

He bobbed up in Virginia about the year 1728, purporting to have come from Scotland In the colony, he engaged in the practice of medicine without, however, being in possession of a medical degree Apparently, he lived a rather unobtrusive life there until 1736 In that year he published in Williamsburg an "Essay on the Pleurisy," announcing his discovery of the use of Seneca rattlesnake root in the cure of pleurisy, and giving at great length the reasons for his coming to the conclusion of its value in that disease Up to this time, Seneca rattlesnake root had been known only as an Indian remedy for snake bite, it being a very common practice for Braves to carry some of the powdered root in a pouch at the waist for emergency use Tennent noticed, as he says, a similarity in the symptoms caused by snake bite and by pleurisy, and was actuated by these observations to make use of the root in his pleuritic cases

His own words were

> Again as I have observed before, since we are to infer the sameness of causes from the likeness of effects, there is another reason why it should be done in this case, and that is that those who have the misfortune to be bit by a rattlesnake, do spit up blood and cough like pleuritic patients therefore it is beyond all controversy, that the blood of a pleuritic patient, and that of one bit by a rattlesnake is in the same state or very near it Upon this certainty of reasoning, I gave the rattlesnake root to several patients in a pleurisy or peripneumony, and its effects were extraordinary I found it to exceed the volatile salt of vipers, or anything that I ever knew given in that disease In short it may justly be deemed a *Certain Remedy* "

Tennent also made use of the columns of the *Virginia Gazette*, a weekly of that time, in the furthering of his discovery This, however, seemed to be too great an affront to the regular physicians of the colony, who proceeded to ridicule his reasoning under a pseudonym in the same paper This went on for about two years, during which time, Tennent made several trips to London

On his first, he took the "Dorsetshire," leaving June 26, 1737 Through recommendations from friends in Virginia, he was able to get an interview with Doctors Tho Pellet, R Mead and Jo Monro These men after hearing his story, recommended him for the degree of Doctor in Physic at the University of Edinburgh This degree he never received, but we have it in his own words that the worth of the practitioner is of the greater importance

Tennent seems to have been a little overzealous in putting up a front in London for soon he was involved in debt He returned to Virginia and petitioned the House of Burgesses for a reward for having made public his discovery This body's first action was refusal, but later it reconsidered, and Tennent was voted the sum of £100 He had expected at least £1000 and was quite disappointed Real disappointment came when two of his American creditors, Charles Carter and Messrs Hanner & King, appealed to the House for the reward and got it

Tennent then managed to return to London There he proceeded to become

more deeply involved in debt, and during this time had as his common law wife, Elizabeth Cary Seeking a way out of his financial difficulties, he appealed to Lord Cathcart for the appointment as Physician General to His Majesties Forces in the West Indies He recommended himself on the strength of his knowledge of the diseases of the country He failed in this, and his offer to go as assistant to the Physician General was likewise refused

Now, Tennent had arrived at a position where he would either have to go to jail or leave England, and it was at this crucial time that a friend, Mr Christian, suggested to him that he marry a lady of fortune, and thus recover his position Tennent took to this suggestion gladly The desired woman was found in Mrs Hanger, a widow of some circumstance, who possessed among other things, an annuity of £50 The marriage was arranged for and took place at St James Church on Sunday, November 8, 1741, the service being read by Reverend Mr Fisher

Three weeks after the marriage, Tennent was lodged in jail for non-payment of debts He managed to borrow enough to satisfy his creditors, and so was released Soon after, he was incarcerated again, and this time after getting out, he made an unsuccessful attempt to sell Mrs Tennent's annuity Again arrested, for not paying a debt of £12, and again released, he found upon returning home that his wife had left him, quite probably on the advice of one of her brothers, Mr Parrat, an attorney-at-law, who couldn't stomach among other things, the attempted sale of his sister's annuity

Distracted, Tennent fled to Scotland, but Mr Parrat apparently had not finished with him The facts of his common law marriage were uncovered, and on June 8, 1742, a warrant was granted for the seizure of Tennent wherever he resided Consequently, he was brought back, and it was after he had been indicted, and was awaiting trial in his cell in the Old Bailey, that he aired his case in a printed pamphlet

Here the picture dims, and then it ends, with a simple notice in the *Gentleman's Magazine* of Tennent's death in London, on October 27, 1748

BIBLIOGRAPHY

Virginia Gazette, Nos 10 31 45, 50, 112, 113, 114, 115 (1736–1738)

J Tennent, Essay on the Pleurisy" (1742)

J Tennent, "Detection of a Conspiracy to Suppress a General Good in Physic, and to Promote Error and Ignorance in That Important Science" (1743)

HISTORICAL PHARMACY IN MINNESOTA *

BY FREDERICK J WULLING

In its seventy-five years of statehood Minnesota has done very well in the recording of historic matters The Territorial Pioneers organized themselves long ago and the Minnesota Historical Society came into being in territorial days way back in 1849 Later with state aid a half million dollar building for collecting and preserving authentic records of historic interest and value was erected for the

* Section on Historical Pharmacy, A PH A , Madison meeting, 1933

Society Histories of many of the cities and counties of the state have been written and some published, not a few in book form, and recently Dr William Watts Folwell, the first president of the University of Minnesota, in the period during which he enjoyed the honor of the *Emeritus* presidency wrote an exhaustive four-volume history of the state, which no doubt will always remain an authoritative historical reference for the period it covers Much could be said of the work and accomplishments of the State Historical Society, but it is my purpose only to convey the fact that Minnesota is fairly well off in recorded historical material

For many years now I have made periodical researches into this material and although I often searched especially for facts of pharmaceutical interest, the field was found almost barren Here and there a local historian mentions a drug store Until very recently I have not found a pharmacist among those who have written historical articles or records relating to Minnesota

This fact and my long association with pharmacists, physicians, dentists and scientists in other fields, led me to the conclusion that the type of mind represented by scientists is not greatly interested in history and that as far as pharmacy is concerned a wider interest in history, at least in its pharmaceutical aspect, should be aroused

As a result of this conviction the Historical Committee of the Minnesota State Pharmaceutical Association was created a few years ago, that is, the members did not object to the addition of another committee to the list of other practically inactive committees The next endeavor was to make the committee effective Charles T Heller, well-known pharmacist of St Paul, who was the committee chairman, was the only productive member However, the seed was sown to arouse a history consciousness among pharmacists Now after several years of preliminary and preparatory work this committee has been enlarged to represent the various divisions of the state Possibly to reward or punish me, neither of which I deserve for my persistency in the matter, I have been made chairman of the committee

It is now certain the committee will do some worth-while work It will be organized toward that end While I have some definite plans to produce effective results, suggestions likely to increase the efficiency of such a committee are invited from my hearers or readers

It would take too much space to repeat all of the instruction and advice given to committee members, but the essential things every member is especially asked to do are to connect events with exact dates, names and localities, get corroborative evidence wherever possible and write down every detail available concerning any event, item or thing of pharmaceutic interest, leaving it to the skilled historian to decide what is essential to select for a representative record

The committee already has the promise of cooperation of the Minnesota Historical Society and one of the joint objectives is the reproduction of a pioneer drug store in the Historical Building

The College of Pharmacy already possesses the nucleus of a pharmaceutical museum, which is slowly developing through acquisition of items purchased out of the proceeds of the Wulling Fund established for that purpose The College, too, will cooperate with the Historical Society and with the Association committee The museum recently acquired what was represented as the counter scale used in

the first or in one of the first pioneer drug stores in Minnesota The scale is still in fairly good condition and may be placed in the proposed pioneer drug store reproduction There are also available in the museum old medicine saddle bags used over a hundred years ago, a blood letting instrument, old wooden iron and brass mortars, plaster irons, four very old show globes, drug and spice grinders, infusion pots, drug jars, old engravings, etc The museum has just acquired a Chinese medicine cooker over three hundred years old and now very rare Negotiations are under way for the acquisition of an old sailing vessel's medicine chest

Work of this sort is no doubt being done in other states or sections of the country If similar agencies could be organized and be made to work in every state, coming historians would feel grateful, not to speak of the real service that would thus be assured pharmacy in general It could well come within the province of this Historical Section of the A PH A to advocate and stimulate such activities in every state

---

Lithuania —In towns pharmacies must be kept open until 9 00 P M , and if there are several pharmacies in a locality the night service is fixed by rota from 9 00 P M to 9 00 A M Country pharmacies must be open from 9 00 A M to 1 00 P M , and from 3 00 P M to 7 00 P M When a pharmacy is closed, a notice must be affixed to the door to indicate the nearest pharmacy which is open

---

PHARMACOPŒIAL SECTION OF THE PAN-AMERICAN MEDICAL ASSOCIATION

BY LEWIS W FETZGER, PH D , M D *

In the past several years there have been a number of serious attempts to get up some enthusiasm on certain methods for rehabilitating the spirit of coöperation which prevailed between the medical and pharmaceutical fraternities in years gone by

Last year a number of forward-looking leaders in pharmacy and medicine met during the Congress of the Pan-American Medical Association, in the city of Dallas, Texas, in an effort to bring about a frank expression of opinion as to the need and feasibility of a section devoted to drugs, with especial reference to the kinds which are in use in the North American and Latin American countries This was done in the hope that by starting persons thinking about the matter there may be something actually accomplished in the perpetuation of an organization that may eventually be a permanent and distinctly helpful enterprise

These discussions served to show how little attention had been paid to the relationship of the pharmacists' problems to those of the medical fraternity Each profession made a cult out of its respective endeavors, and has treated it as a sacred and highly protected constituency The discussions, to say the least, opened the way for a line of inquiry that would be most interesting and productive

The gap between the medical and pharmaceutical professions is more a spurious one than real When present the gap is a very narrow one and shows itself chiefly in the attitude of mind due to a lack of a suitable vehicle for the interchange of thought

The Pan American Medical Association expresses the idea of the mutual relationship and the interdependence of the professions which aid medicine in pushing forward the boundaries for more exact knowledge Its effort in that field is a give and take process in which any one of the participants may often receive quite as much as it gives

Commensality will be the rule for the next Congress It will be a "Floating Congress" aboard the S S Pennsylvania The itinerary, requiring sixteen days, March 14 to 30 1934 will include Havana, Colon, Cartagena, Puerto Cabello, La Guaira and San Juan The idea is novel in many respects, and it is reciprocal in that it brings the Congress to the very doorsteps of our Latin-American brethren

This represents the finest type of correlation, and we need have no fear of the outcome

Theodore J Bradley was in charge of the Section on Pharmacopœias at the Dallas meeting

* Chairman, Section on Pharmacopœias, Pan-American Medical Association

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P EDITOR OF THIS DEPARTMENT

Editor's Note The following paper by Prof Edward P Claus presents a method of teaching microscopical pharmacognosy that will make a subject that, to some, is dry, uninteresting and impractical, become interesting, instructive and enjoyable I am fully aware of the fact that botanists will not agree with me that microscopical pharmacognosy may be what I have implied, but personal experience tinges my views I am also aware of the fact that I have no authority to criticize the teaching of subjects outside of my field, but if all students including those that may have special interest for the subject, must take certain courses, then it is our duty to make them as interesting as possible A dry subject may become intensely interesting in the hands of a good teacher and a live one may lose all interest in the hands of a poor teacher The paper by Prof Claus will be helpful to teachers of pharmacognosy —C B JORDAN, *Editor*

MICROSCOPICAL PHARMACOGNOSY

BY EDWARD P CLAUS *

Dr L K Darbaker has not given me his original paper on this subject, but since his ideas embody our teaching plan, I shall try to relay to you some of his thoughts

In the Pittsburgh College of Pharmacy, School of Pharmacy, University of Pittsburgh, the student in the freshman year studies biology, in the second year microscopy and in the third year, histological pharmacognosy He has a distinct advantage in these studies by performing practical work in the same laboratory for these subjects under the guidance of the same group of instructors The work has been correlated in such a manner that one course is related directly to the next

The members of our department feel that when the average student enters college, in no matter which field, he is more or less ill at ease, nervous and easily discouraged due to the extreme change in environment In consideration of these factors, we believe that the best method of beginning instruction in biology is the laboratory study of plant specimens with which the student is familiar, particularly, members of the spermatophytes which he sees practically every day This procedure is in direct contrast to the usual method of study from the taxonomical viewpoint, from the lowest to the highest forms However, we feel that, given something he can identify and examine easily, the student's first few days are made more pleasant, and his attention and interest are stimulated A field aster, a morning glory flower, bean seedlings and corn seedlings, for the first few laboratory hours, followed by more complex spermatophyte forms, then members of the pteridophytes, bryophytes and thallophytes, interspersed with simple experiments on growing plants constitute the first semester's work Living material is used whenever possible Microscopical work is not considered except if important structures or tissues are to be seen, and then the microscopical slides are under the direct supervision of the instructor in charge During the freshman year, the student is directed in the proper method of collecting, drying and mounting of botanical speci

* Bacteriology and Pharmacognosy, School of Pharmacy, University of Pittsburgh

mens, particularly of plant drugs, is encouraged to start an herbarium, and is given opportunity to enlarge this collection throughout his school career Last year a number of our students displayed such mounts of medicinal plants in drug store windows during pharmacy week The second half of the biology course is devoted to zoology in the same anatomical manner, from the higher, more familiar forms to the lower forms, macroscopic work only being considered Field work, museum trips and trips to the medicinal plant garden are essential parts of the biology course

The second year microscopy work first considers the microscopical animals, completing the zoology course, and then microscopical plants, of the algæ and fungi groups Hence, this particular part of the work might be termed microbiology, with the exception that bacteriology proper is not touched upon in laboratory until the student's senior year After the student has completed the microscopical botany course, observing single-celled plants as gleocapsa, pleurococcus and the like, the next natural step is the simplest cell of the higher plants, the parenchyma cell This relationship is stressed, comparisons being made in the manner of structure, functions, reproduction, etc From this point on through, the sophomore year might be termed elementary histological pharmacognosy, since in each laboratory period, the student learns of new cells and tissues, and of official plant drugs in which these cells and tissues are found Instruction is given in the preparing, sectioning, staining and mounting of plant drugs A study of starches, crystals, cell contents and fibrovascular bundles is also considered

The third year histological pharmacognosy course enables the student to study how the various combinations of cells and tissues constitute the various plant parts He studies the official plant drugs in groups *i e*, barks, woods, roots, rhizomes, leaves, flowers, seeds, fruits, etc Then, since he has a thorough knowledge of each individual cell, he can readily identify the plant part and tissues present in, for instance, a section of Apocynum cannabinum or in a powder of the same drug Also he can identify powdered drugs and upon examination of a powder, he can state whether it is adulterated or not by the mere presence of a number of cells foreign to the plant part in question His microchemical tests would enable him in some cases to name the adulterant Since such products as talcum powders, artificial foods, infant foods, spices and condiments are commonly sold in the retail pharmacy, microscopical examination and microchemical tests for these products form an important part of the student's training

All of the laboratory work is supplemented with lectures, recitations, displays, lantern slides, motion pictures and demonstrations as well as field work By means of this orderly arrangement and obvious relationship of courses, we are convinced that the average student is encouraged to do better work, and is able to grasp the subject matter more easily and in a more coördinated form

SHALL THE RELATIONSHIP OF BOTANY TO PHARMACOGNOSY BE MAINTAINED?

BY C W BALLARD, PHAR D , PH D *

Editor's Note The old question as to whether basic subjects should be taught by men trained in pharmacy is presented by Dr Ballard in so far as it applies to botany His arguments

* New York College of Pharmacy, Columbia University

are excellent and no one will gainsay that it is not better to have these subjects taught by men trained in pharmacy *provided* they are specialists in their fields Such teachers can make the application to pharmacy much better than can a teacher who is not so trained However, we must recognize the fact that it is exceedingly difficult to secure well-trained specialists in general sub jects who are also well trained in the professional subjects that are based upon them Dr Bal lard's paper is worthy of careful reading by all interested in teaching pharmacognosy —C B JORDAN *Editor*

The procedure of the current Pharmaceutical Syllabus in its division of subjects into basic and professional groups is excellent However, owing to the close relationships between botany and phamacognosy, it is unfortunate that the content of the basic botany is not definitely stated The subject matter of pharmaceutical botany in previous editions was manifestly too restricted to give the student a general knowledge of plants but it was a clear-cut statement of what the pharmacy student should have covered in his course It diminished the difficulties of drawing a line of demarcation between botany and pharmacognosy as regards content

The policy of extreme generalization is just as objectionable as that of specialization in planning any professional curriculum This is especially true in pharmaceutical education because of the varied nature of the subjects included in the course It is entirely possible in a university maintaining schools or divisions of business, chemistry, medicine, botany and the usual academic or collegiate courses to cover all the subjects of the outlined pharmacy curriculum, with the exceptions of pharmacy and pharmacognosy Economic conditions are perhaps increasing the frequency of this procedure It is desirable that purely academic subjects as English, languages and mathematics be taught by those qualified in these branches and not by pharmacy school instructors However, in subjects of the science group it is desirable that the instructor consider both the general aspects of the subject and its relations to pharmacy In this manner we can better further the claims of pharmacy as a vocation requiring a thoroughly integrated course of professional education

The advisability of securing contact between botany as a basic subject and its specialization, pharmacognosy, has been frequently commented upon The general tenor of these comments is reiterated in a paper, "The Teaching of Pharmacognosy," by Prof Bacon (JOUR A PH A , Nov 1930), in which the following statements occur "The nature of the botany courses offered to pharmacy students should be carefully considered pharmacy students as well as students of other schools should be given in their first courses sound, working fundamentals to serve as a basis in specialized study " That this advisability of a proper coordination between basic and professional work applies equally well in other subjects, is evidenced by the following quotations from the current syllabus

Page 32 (*Applied Bacteriology*) ' When laboratory courses in Bacteriology are given to pharmacy students in medical, biologic or other departments, the attention of instructors should be called to the specific pharmaceutical applications listed below "

Page 51 (*Inorganic Pharmaceutical Chemistry*) ' Experience has proven that it is unwise to rely too much upon an understanding of subjects previously studied "

Page 128 (*Pharmacognosy*) ' Terms which students have supposedly learned in botany are not repeated but these terms should be used and applied "

I am not unmindful that the adoption of the blanket statement "standard college grade" for botany presents the following possible advantages—it checks tendencies to narrow the botanical teaching to those portions applicable to pharmacognosy, thus limiting its general educational features, it favors a mingling of the pharmacy men and the students of other schools, it relieves the pharmacy school of the labor and expense of a division of botany, it is a convenience in schools where the bulk of the general education is segregated as a pre-pharmacy year, it facilitates transfer of students to or from a pharmacy school to other schools of a university But against all these possible advantages is the question of what constitutes standard college grade, particularly in botany, and the interpretations which individuals and colleges may place upon this term A statement of hours does not remedy the situation There is probably a greater diversity of opinion as regards content of the courses in the botanical subjects than there is in pharmacy and chemistry Hence, there is a greater necessity for definite statements as to the content of the botany course Furthermore, the statement in the Syllabus of the reason for the omission of syllabi for the basic subjects is perhaps the strongest argument for their inclusion If the emphasis on integral parts of a given basic subject varies so appreciably in different colleges, it would appear advisable to establish some guide as to where, in the opinion of pharmaceutical educators, the emphasis should be placed Notwithstanding the general statement that basic subjects are not applied, I hardly think there will be a difference of opinion among us as to the applications of botany in the teaching of pharmacognosy

Failure on the part of the teachers in pharmacy colleges to at least attempt to influence the trends of teaching in the basic subjects may be construed as due to lack of necessity, lack of interest or, what is worse for pharmaceutical education, incompetency and I do not believe that these conditions prevail Formerly in many instances, the instruction in botany and pharmacognosy in the pharmacy school was given by men whose sole botanical training was received in the pharmacy course Frequently this specialization, together with lack of time, resulted in a restriction of the course in botany to its strictly pharmaceutical applications At present, in a goodly number of schools, pharmacognosy and botany are taught by men who have not only been pharmaceutically trained but in addition have studied botany in other institutions and in some instances have majored in this subject for an academic degree Their viewpoint is broadened and they are as capable of teaching general botanical science as the instructor in an academic college I believe that these men can outline a course in botany which will be acceptable to our universities as of standard college grade and which will serve as a better foundation for pharmacognosy than the usual academic course

The construction of a syllabus in botany to meet our requirements, both general and specialized, offers no serious difficulty Undoubtedly each of us would find that the introductory course in botany in our respective universities is considered a course of standard college grade With this as a working basis, the planning of a course to maintain the integrity of botany as a basic or cultural subject and at the same time place the proper emphasis on its relations to pharmacognosy, is entirely feasible The syllabus for botany submitted by Prof H R Totten in the preliminary draft of the present Syllabus, is an excellent example of the coordinating of botany with pharmacognosy without sacrificing the interests of either In our

university class, for the past eight years, we have been giving a course along similar lines The basis for our course is Botany 1–2 of Columbia College in an amplified and supplemented form to better meet our needs as a preparation for pharmacognosy Pharmacy men who subsequently enter other schools in the university receive 6 points of credit for the botany of the pharmacy school The time allotted is 240 hours, 96 didactic and 144 laboratory

Our foundation course in botany must also be considered as related to microscopic pharmacognosy and here the desirability of correlation is even greater than in macroscopic pharmacognosy Many of the academic courses in botany very properly present the topics of cellular structure and cell contents merely as incidental factors in plant organization and function This plan fits the needs of the college freshman rather than those of the pharmacy student as the former may or may not apply his knowledge of botany in subsequent work, whereas the pharmacy man must do so in pharmacognosy Where school organization compels a separation of botany and pharmacognosy, the content of the latter course must be increased and duplication is almost unavoidable The difficulties of maintaining correlation between separated courses are known to all teachers If the student receives part of the instruction on fibres, trichomes and starch grains in the botany course and another part in pharmacognosy, it is more than likely that duplication will be necessary The instructor in pharmacognosy must review the previous work or rest under the uncertainty as to how well it has been retained by members of a class His uncertainty is materially increased if the teaching in botany is without specification as to content

It is to be regretted that microscopic pharmacognosy has been classed as an optional subject The legal standards for drugs require familiarity with the microscopic as well as the macroscopic characters In the pharmacy curriculum the purpose of our instruction in pharmacognosy is to enable the pharmacist to intelligently read the official descriptions Giving microscopic pharmacognosy a secondary classification not only permits the elimination of a necessary professional subject but one which gives promise of ready recognition in academic botanical circles

We are all familiar with the tendency on the part of other educational institutions to minimize the work of the pharmacy college Of all the subjects in our curriculum, pharmacognosy is perhaps the one upon which we can rest our strongest claims for academic recognition It is a type of work which is not duplicated in any other part of a university Its scope and research angles are sufficiently broad as to warrant it being included with graduate courses in the division of botany in any university To further this recognition we must assume responsibility for the botanical courses which are the foundation for pharmacognosy We must not concede that an introductory course in botany without qualification as to content, constitutes an adequate preparation for pharmacognosy

COLLEGE OF PHARMACY,
COLUMBIA UNIVERSITY

Hungary—Pharmacies must always be open to the public An edict of 1919 fixes the opening hours from 8 00 A M to 7 00 P M For night service, Sundays, holidays, the authorities arrange a rota with the pharmacists for opening from 1 00 P M

RELATION OF CAFFEINE AND COFFEE TO HUMAN EFFICIENCY *

BY RALPH HOLT CHENEY

Efficiency and diet occupy a more prominent position in the public mind to day than in all previous history At the moment, caffeine beverages, especially coffee, are lauded or berated vigorously regarding their value in the diet in relation to human efficiency

Based upon "whims and guesses," coffee has been praised or condemned for centuries What is the scientific evidence "pro" and "con?" Historically, we find a prohibition edict by Khaine Beg, Governor of Mecca in 1511, who started a campaign which condemned coffee as an inebriating beverage forbidden by the Koran because the people frequented coffee houses rather than the mosques Coffee and coffee houses were taxed by European governments as a source of revenue Later, coffee houses were prohibited by Charles II of England as "Seminaries of Sedition" Coffee houses have served as gathering places for public discussions of governmental affairs They were the predecessors of the boulevard cafés of Paris and the coffee-house taverns of England This English prototype appeared in the United States where the coffee houses of Boston and New York harbored the instigators of the Boston Tea Party and revolutionary propaganda

In spite of six hundred years of agitation associated with coffee, its consumption has increased constantly from an insignificant amount to three billion pounds annually, and its use has spread from the Abyssinian hillsides to world wide consumption Mocha coffee from the original home of the plant now supplies less than 3% of the seeds (coffee beans) of this sweet-pulped, cherry-like fruit which was introduced in America in 1717 Its cultivation has changed the economic map of several countries Brazil has two billion coffee trees, Colombia a quarter billion, and the success or failure of the crop is the chief factor in the economic situation in these countries Eighty per cent of the total gold value of Salvadorean exports is coffee Although the plant is foreign to American soil, no better coffee is marketed to day than the Colombian or Brazilian Santos from the Uplands where it is prepared by the most modern methods

The United States consumes over one-half of all the coffee exported from the cultivated areas New York City requirements annually total seventy million pounds, for which we pay thirty million dollars Space limitation causes me to refer you to a book, "Coffee" (1), published by the New York University Press, for botanical characteristics, and also, for further details of the interesting, romantic history and economics of the plant and its beverage

Undoubtedly, more scientific experimentation on the subject of caffeine and coffee effects has been conducted during the last twenty-five years than in all previous time The results of such investigations are the only justifiable bases from which we may make our deductions regarding the physiological effects of the coffee as such, and of its individual ingredients

Many investigators have reported that caffeine and caffeine beverages are undesirable for young children neurotics, sufferers from severe arteriosclerosis, gastric hyperacidity, and other abnormal conditions Likewise, the administration of caffeine for therapeutic purposes, such as stimulation of the coronary circulation in cardiac deficiency, are well known May I make it perfectly clear, however, that the data presented in this paper is not concerned with the allergic effects of caffeine nor of the coffee beverage upon pathological conditions This paper does not deal with its therapeutic value All statements and figures refer entirely to *normal* physiology The experimental animals and human subjects employed in the investigations were selected purposely from individuals of as nearly average good health as could be determined readily In the caffeine work, the Merck product was used, and in the coffee work, the beverage was prepared by a rapid method (drip or vacuum) from recently torrified Colombian and Brazilian high-grade beans

Isotonic and isometric records of striated muscle fatigue curves of homologous muscles were made under non-treated and caffeine treated conditions The method and period of treatment were maintained uniformly throughout the series Detailed discussions may be found in the writer's earlier papers, especially on the animal gastrocnemius behavior (2, 3)

Although Herxheimer (4) found that caffeine was of no benefit to the athelete and P T Osborne states that caffeine actually interferes with the best muscular effects, the experimental data in this paper are more in agreement with H C Wood Jr, (5) and others whose results offer definite evidence of improved muscular function

* New York Branch, A PH A —See page 70, January JOURNAL

An extended series indicated that better physiological coordination of the motor mechanism was obtained in the striated muscle action of the frog under the influence of low concentration of caffeine According to the data presented in the August 1932, issue of the *Journal of Pharmacology and Experimental Therapeutics*, the optimum dosage (3) for these muscles for delaying fatigue was 0 1 mg per Gm body weight Similar studies using the coffee beverage as such, in lieu of the purified caffeine showed a parallel response for the gastrocnemius muscle

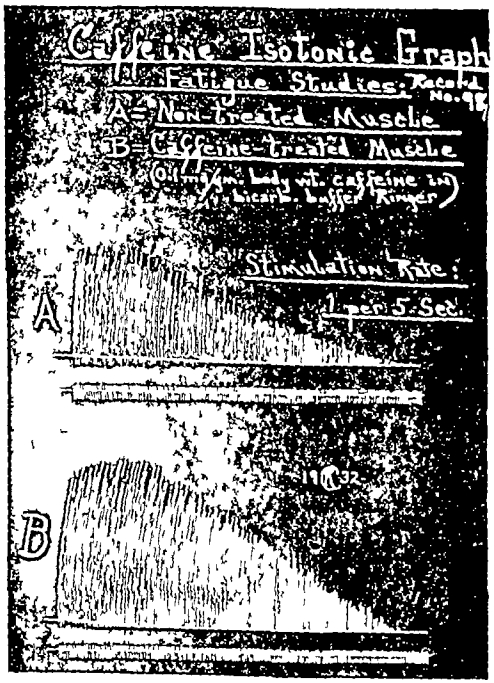


Fig 1 —Caffeine isotonic graph

A mathematical analysis of these fatigue curves in computing the XY values (Time *to* one half fatigue × Height *at* one half fatigue) demonstrated a greater XY value in both the caffeine and coffee curves as compared with the normal, non treated result

Under uniformly controlled circumstances a study of the physical fatigue in human male subjects was attempted The variable factor was the treatment, namely, the consumption of equal volumes of hot water, black coffee or hot water plus caffeine (equivalent to the amount in the coffee) prior to the fatigue test involving a weight-lifting exercise every ten seconds to complete fatigue Additional non treated, starch capsule plus hot water, or plain hot water days were completed in order to correct for any practice, accommodation or experience factor which may have developed during the experimental tests The Work Done was computed by the simple formula WD = Weight (Gm) × Height lifted (cm) × Number of lifts The result in gram-centimeters showed a sequence of an increasing amount of Work Done in the order of the non treated or hot water day (least), coffee day, caffeine day (most) Attention was given primarily to the following physiological factors

1 Blood pressure variations Systolic and diastolic

2 Respiration Rate and depth by pneumographic record

3 Time required for a complete recovery of all factors after fatigue

As compared with the non treated fatigue values, the blood pressure and pulse variations were negligible, that is, their variation under the treated conditions was similar to their variation under the non-treated conditions The increased respiratory rate and depth in the coffee instance indicated an increased oxygen consumption

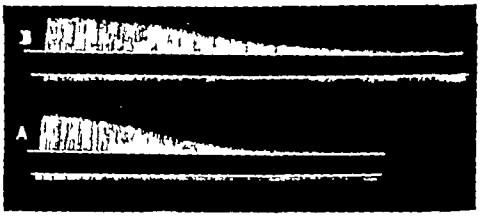


Fig 2 —Caffeine isometric graph

Fatigue Studies Record No 888
A = *Non treated* muscle, B = *Caffeine treated* muscle (0 1 mg /Gm body weight caffeine in bi carb buffer-Ringer) stimulation rate 1 per 5 sec

Several years ago (6), I conducted a series of tests to determine blood-pressure variations *without fatigue*, as influenced by caffeine and by coffee in comparison with normal behavior This work has been repeated recently as an additional series Similar and additional substantiating data were obtained The accompanying graph separates the primary and secondary coffee effects

and indicates the fact that other substances are involved besides caffeine in the total coffee effects Note that the caffeine or coffee increased the blood pressure only a few millimeters in excess of the ordinary luncheon (food) effect

Although caffeine has been reported as a vaso dilator of cerebral vessels, investigations (7) by Dr P G Denker of Bellevue Hospital caused him to conclude that caffeine definitely lowers the cerebrospinal pressure for half an hour This fact is suggested by some workers as a possible explanation of the recognized relief induced by coffee in instances of mild hypertensive or nervous headaches cerebral concussion fractured skull and brain tumor Sollman and Pilcher (8) reported in 1911 that caffeine causes vaso dilation of the cerebral vessels Wiechowski (9) had reported similar results in 1902 and claimed the dilation was due to a direct decrease in the tonus of the intracranial vessels Such action with a rigid cranium would force out the cerebrospinal fluid and increase its pressure Denker obtained the reverse results With reference to the decreased cerebrospinal pressure it is significant that caffeine diuresis through glomerular action, involves primarily only an increase in the water content of the urine This water loss must be lost necessarily from the body tissues through the lymph and blood It must accomplish

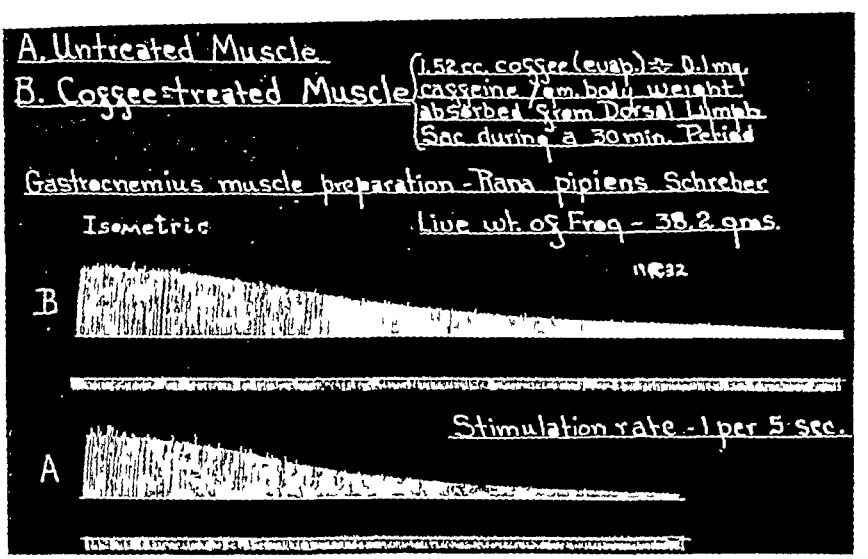


Fig 3 —Coffee effect on muscular fatigue

automatically a reduction in brain volume with a consequent decrease in cerebrospinal fluid pressure

The increased respiratory rate and depth, referred to earlier in connection with the fatigue as influenced by caffeine and coffee, is related also to an intercranial pressure In 1913, Dixon and Halliburton (10) noted that reduction of carbon dioxide in the blood decreases the rate of cerebrospinal fluid secretion Therefore, respiratory stimulation by caffeine or coffee, resulting in increased rate of carbon dioxide ventilation from the lungs, would decrease the rate of cerebrospinal fluid secretion Apparently, caffeine lowers intracranial pressure by means of its combined pharmacologic actions rather than by any specific, single effect

Dr A L Winsor (11) of Cornell University reported last October that coffee increases the salivary secretions in volume per unit of time Such stimulation automatically improves digestion by making a greater enzymic mass available

Professor Hollingworth's experimental series (12 13) on the mental effects of caffeine and coffee are the best available studies on this phase of the subject He reports a clearly distinguishable mental stimulation as evidenced by greater accuracy in the performance of work done

Recently at Long Island University, a simplified psychodometer was devised to measure the reaction time in man with a visual mental-physical coordination test Quantitative data on

the relationship of caffeine and coffee separately to the normal reaction time were compiled The subject was required to recognize a visual stimulus (light color), interpret it, and perform a muscular act in accordance with the color of the particular stimulus involved Caffeine and coffee were each more effective in reducing the total reaction time in women than in men The sequence in both sexes was as follows

1 Non treated tests required the longest reaction time
2 Coffee—intermediate
3 Caffeine-treated tests required the shortest reaction time

In various physiological effects studied regarding muscular action, fatigue delay, respiration pulse and mental effects, the sequence of minimum to maximum physiological stimulation is generally non treated, coffee treated caffeine treated The absence of injurious effects in the majority of cases suggests the importance of optimum consumption Excessive stimulation can be produced but was not apparent in the amounts administered in the experiments upon normal animals and man, although the quantities given were in excess of average consumption The absence of after effects and accumulative effects is associated doubtlessly with the two primary facts

1 Caffeine is combined with other chemical substances in coffee
2 Caffeine itself loses CH_3 groups in the body and is excreted within a few hours in the urine as mono- and dimethyl xanthine

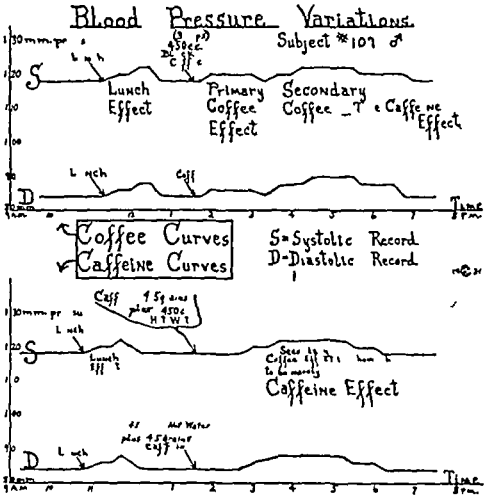


Fig 4 —Blood-pressure variations caffeine *vs* coffee effects

Likewise, Gutman (14), in agreement with this conception, observed that caffeine and coffee effects are not the same in abnormal persons (patients) showing allergic manifestations to coffee Whereas caffeine may cause definite physiological disturbances, coffee may be well tolerated Moreover, the action of coffee is not due solely to caffeine, but to the many compounds organized during the roasting process, and which are present in both decaffeinated and ordinary coffees

Caffeine and coffee increase blood pressure very few millimeters, respiration and oxygen consumption slightly, and stimulates the brain and other parts of the central nervous system These stimulants also delay fatigue and lower the cerebrospinal pressure Caffeine is less effective in the coffee beverage than separately Neither complex, caffeine nor the coffee beverage as such, can replace nutritive metabolism in the normal health of the tissues It has been reported that both complexes increase basal metabolism, hence, food should always be taken regularly at the customary periods if the reserve forces of the body, which are reduced by increased metabolism, are to be replenished properly Nevertheless, many people labor under the misconception that coffee has the ability to replace food merely because its stimulating action persists for several hours after consumption It is an aid to functional efficiency, not a substitute for body fuel

The variations from the normal due to coffee stimulation are slight and, in the reasonable amounts consumed ordinarily, are far below the maximum physiological disturbances, for the correction of which the body is equipped by nature to adjust itself without injurious effects

Apparently, the delicate correlation between the increased blood flow and the increased respiratory rate accomplishes, in a fortunate sequence, *both* the more rapid removal of fatigue products from the body tissues to the blood, and, the greater purification (oxidation) of the blood

volume per unit time in the lungs Fatigue, due to the accumulation of waste products in the tissues, is correspondingly delayed Caffeine separately or in the coffee beverage, stimulates the circulation and respiration The increased activity of one of these systems without a parallel response by the other, would be injurious The stimulation of both synchronously, produces or "sets" the body metabolism at a higher level of physiological efficiency That the body readily adjusts itself to the level of performance without injury is evidenced by the fact that the recovery time of the fatigue is practically identical with conditions subsequent to normal fatigue

The bulk of available experimental data seems to indicate that the majority of the population may take advantage of this beneficial aid to body metabolism Every debatable question has its ' pro" and "con " Each of us has a caffeine and coffee tolerance which must be determined individually, and our consumption governed accordingly

BIBLIOGRAPHY

(1) R H Cheney, 'Coffee," New York University Press (1925)

(2) R H Cheney, "The Caffeine Influence on Isotonic Contraction in Striated Muscle Fatigue Studies," *Arch intern Pharmacodynamie*, 42 (1932), 173

(3) R H Cheney, "Relation of Caffeine Dosage to Body Weight in Striated Muscle Response," *J Pharm and Exper Therap* , 45 (1932), 389

(4) Herxheimer, *Münch med Wochschr* , 69 (1922), 1339

(5) H C Wood, Jr , "The Effects of Caffeine on the Circulatory and Muscular Systems," *Therap Gaz* (Jan 15, 1912), Reprint

(6) R H Cheney, "Caffein und seine Wirkungen auf den Menschen," *Deutsche Aerzte-Zeitung* 4, No 159 (1929), 1

(7) P G Denker, "The Effect of Caffein on the Cerebrospinal Fluid Pressure " *Amer J Med Sci* , 181, No 5 (1931), 675

(8) T Sollman and J D Pilcher, The Action of Caffein on the Mammalian Circulation," *J Pharm and Exper Therap* , 3 (1911), 19

(9) W Wiechowski, 'Über den Einfluss der Analgetica auf die intracranielle Blutcirculation," *Arch Exper Pharmak u Path* , 48 (1902), 376

(10) W E Dixon and W D Halliburton, 'The Secretion of the Cerebrospinal Fluid," *J Physiol* , 47 (1913), 215

(11) A L Winsor, "A Study of the Development of Tolerance for Caffeinated Beverages," *J Exp Psych* , 16, No 5 (1933), 725

(12) H L Hollingworth, "The Influence of Caffein on the Speed and Quality of Performance in Typewriting," *Psych Rev* , 19 (1912), 66

(13) H L Hollingworth, "The Influence of Caffein Alkaloid on the Quality and Amount of Sleep," *Am J Psych* , 23 (1912), 89

(14) M J Gutman, ' Allergic Manifestations Produced by Stimulants," *Deut med Wochschr* (Leipzig), 59 (Sept 15, 1933), 1429

HOSPITAL SALES EXEMPTED FROM CODE RESTRICTIONS

Hugh S Johnson Administrator for Industrial Recovery, has issued the following order effective from February 2nd

"Pursuant to authority delegated to me by executive orders of the President, including Executive Order No 6543-A, dated December 30, 1933, it is hereby ordered that those members of industries subject to codes of fair competition who sell or may sell supplies or materials to hospitals of the United States which are supported by public subscription or endowment, and not operated for profit, within the limitations hereinafter provided, be and they are hereby exempted from compliance with provisions of such codes governing sales, provided, however, that the exemption hereby granted shall be limited to and operative only in connection with such sales made by such members to such institutions, that nothing in this order contained shall relieve any such member at any time from the duty of complying with all other provisions of such codes, and that this order shall not become effective for a period of ten days in order that consideration may be given to the objections, if any, of interested parties thereto At the expiration of such period this order shall become effective unless I, by my further order, otherwise determine "

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council" —Part of Chapter VI, Article VI of the By Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues paid members of the Association holding not less than six meetings annually with an attendance of not less than 9 members at each meeting and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

CHICAGO

The monthly meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held January 16, 1934, at the University of Illinois College of Medicine

President Terry opened the meeting and called for the report of the nominating committee for officers of the Branch for the ensuing year Dean Day chairman of the committee, presented the following nominations

President G L Webster
First Vice-President, S W Morrison
Second Vice-President R A G Linke
Third Vice-President, H M Emig
Secretary Treasurer, L Templeton
Delegate to the House of Delegates, R E Terry
Committee Chairmen

Membership, Thomas P Rylands, Legislation, J Riemenschneider, Practice I A Becker, Medical Relations Dr Bernard Fantus, Publicity A E Ormes

By a unanimous vote the nominees were declared elected

Secretary Treasurer L Templeton was called upon to give a financial report of the past year The report showed a balance of $1 15 in the treasury

Dr Muehlberger, chemist for the County Coroner, was introduced as the speaker of the evening His subject was "The Toxicology of Common Drugs" He stated that due to the nature of his position he was experienced primarily with fatal poisonings A summary was made of the types of fatal poisonings that he was called upon to investigate, such as accidental, suicidal or with criminal intent Mention was made that fashions were found in suicides due to the publicity that follows in the newspapers

Common poisons and their detection by (1) odor, (2) chemical analysis, (3) biological analysis, (4) quantitative analysis were discussed at some length There must be proof beyond doubt for criminal court procedure

Dr Muehlberger pointed out that quantitative results were very hard to obtain in the case of mercury or arsenic poisoning due to the fact that the organic preparations of these two elements will show large amounts of the element in the body, which means nothing so far as a fatal dose is concerned

Lye as found in sink and drain cleaners, was mentioned as being one of the worst poisons to combat, as scar tissue is produced that fails to heal quickly The lye seems to eat deeper into the tissues as time goes on The acids do not produce an insidious scar tissue

Dr Muehlberger stated that he had not used Methylene Blue as an antidote for cyanide or carbon monoxide poisoning, but had read much of the literature that was being published lately regarding its use He had found amyl nitrite, sodium nitrite and sodium thiosulphate to be beneficial in the treatment of these poisonings

The discussion was followed with an open question and answer period which was thoroughly enjoyed by the large group assembled

The meeting was closed by the newly elected president, G L Webster

L TEMPLETON *Secretary*

NEW YORK

The January meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on January 8 1934, in the College of Pharmacy, Columbia University President Bilhuber was in the chair and about fifty-five members and guests attended

The report of the secretary was read and accepted Following this Mr Currens, treasurer, reported

Chairman Lehman, of the Committee on Legislation and Education, reported that the State Board of Pharmacy was gathering samples in cosmetic shops to see if their drug products met Pharmacopœial requirements

Chairman Kidder, of the Professional Relations Committee, reported that the Physicians' and Pharmacists' Dinner Committee was still functioning Dr Wimmer reported a physicians' and pharmacists' meeting to be held by the Academy of Pharmacy in February Dr Ballard called attention to the meeting of the Bronx County Medical Society on January 17th, for which a display of U S P and N F preparations was being arranged

The chairman of the Membership Committee, Dr Kassner, reported applications for Branch membership from Frank Pokorny, John Torigian and Richard G Keller All were voted to membership in the Branch

Chairman Lehman of the Nominating Committee, reported the following nominations for Branch officers during 1934

President, Charles W Ballard
Vice President Frederick C A Schaefer
Treasurer, Turner F Currens
Secretary, Rudolf O Hauck
Chairmen of Committees
Audit, Ernst A Bilhuber
Professional Relations, Herbert C Kassner
Legislation & Education, Robert S Lehman
Progress of Pharmacy Morris Dauer
Membership, George J Simpson
Secretary Remington Medal Committee and Delegate to House of Delegates, Hugo H Schaefer

Mr Lehman also reported that the Nominating Committee recommended that the chairmen of the respective committees should appoint members who could report at the meetings should the chairman find it impossible to attend

On a motion made by Dr Schaefer and duly seconded by Dr Kidder the secretary was requested to cast one ballot electing the new officers unanimously Dr Schaefer included in his motion the recommendation of the Nominating Committee pertaining to appointed members for the several committees

Following the election of officers Dr Bilhuber thanked the members of the Branch for their coöperation and turned the meeting over to President Ballard The new president expressed his appreciation to the Branch for the honor bestowed upon him and proceeded to briefly outline plans for future meetings

After some brief introductory remarks, Dr Ballard presented the first speaker of the evening Mr James F Hoge who spoke on the Tugwell Bill, the Black Bill and the Copeland Bill Mr Hoge's discussion was from the viewpoint of the lawyer Brief abstracts of his comprehensive address follow It will be understood that it is difficult to do justice to the speakers, whose well prepared addresses are based on careful studies of the legislation

FOOD AND DRUG LEGISLATION

ABSTRACT OF AN ADDRESS BY JAMES F HOGE OF THE NEW YORK BAR

Mr Hoge introduced his remarks by stating that the food and drugs legislation involved the question as to whether the legislation shall be by Congress an enforcement by the courts as now, or legislation and enforcement by a government officer in the Department of Agriculture

The speaker outlined some of the activities of the present drug law which was enacted in 1906 He stated that dissatisfaction with the present law is usually asserted in four principle respects *First* to establish a violation of the law the Government must prove that statements regarding curative effects of drugs are not only false but are also fraudulent He said that there is reasonable argument for the suggestion that the Government should be relieved of the burden, and added that where an honest mistake is made through error or inadvertence it seems harsh to inflict criminal punishment, but the public health is involved *Second*, criticism of the existing law is, that it does not apply to advertising *Third*, the present law does not apply to cosmetics *Fourth*, the general complaint is that the law needs improvement in definitions and administrative detail

He referred to the fact that the Tugwell bill as first formulated would vest in the

Secretary of Agriculture broad and almost unsupervised legislative, executive and judicial powers Mr Hoge spoke at length regarding the latter provision in discussing the Copeland bill

The speaker gave a history of the various bills which have been introduced and analyzed, the Copeland draft, which he said evidenced that criticisms made of the Tugwell bill were valid In his opinion, the Copeland bill shows the sincerity, fairness and intelligence of the Senator This proposed legislation is a revision of the Tugwell bill which it follows section by section and in some sections its language is retained the speaker gave a careful analysis of the draft and an explanation of the changes which have been made

He stated that the general administrative provisions of the Tugwell bill have been deleted and in their place a new section has been inserted which authorizes the secretary to promulgate regulations with the aid and advice of a committee on Foods and a committee on Drugs each to consist of five members appointed by the President of the United States The bill provides for court review of regulations vesting the courts with jurisdiction to restrain by injunction enforcement of any regulation shown to be unreasonable and not in accordance with law or that will cause the petitioner substantial damage by reason of this enforcement

After further discussing the Copeland legislation the speaker analyzed the bill in the House of Representatives by Congressman Black which carries in its provisions the amendments suggested by James H Beal He said that to accomplish the objectives it is largely a matter of choice whether the new bill is enacted or the present law amended For amending the law the bill by Congressman Black will accomplish the purpose and Senator Copeland's measure will do so in an entirely new law Neither of these bills are subject to the criticisms and valid objections which were made to the Tugwell bill

The speaker discussed the power of seizure vested in the Secretary of Agriculture The former bill modifies this power and the Copeland bill retains substantially the Tugwell provisions He discussed at some length the advertising provisions and wording of labels He said that speakers for the Tugwell bill referred frequently to the regulations being subject to review by the courts and violations of the prohibitions of the bill can be established by trial He said this was neither theoretically nor practically true under the bill as drawn He spoke at length regarding multiple seizures and the effects and referred to the fact that the Government has seized, for instance in New York, Pittsburgh, Philadelphia, Baltimore, Oakland, Calif, Portland, Me, Miami and elsewhere, simultaneously with the threat implied in the situation that if an adjustment of the controversy satisfactory to the Department is not promptly made more seizures will follow The speaker gave a very complete explanation of the effect of such seizures He said that as a legal matter and as proper law-making the seizures should be limited to adulterated poisons, putrid or filthy goods and misbranding should be punished by indictment and prosecution with a hearing at which the differences may be reconciled He said, "it is conceivable that misbranding of a flagrant nature representing an article to be a cancer cure might be imminently dangerous to public health and the public should be protected" To protect the public against that and also to afford the defendant an opportunity to be heard a proceeding in equity by the Government for injunction would be appropriate Provision for this is made in the Black bill and a simple amendment to the Copeland draft would make a similar provision

The speaker concluded his remarks by saying that we should have legislation which will not violate American principles of law-making and law enforcement, a law that is fair to the public and to the people who try to do business with the public The legislation should, as far as possible, stamp out fakes and frauds and he thought that such legislation could be had without discarding our legislative and judicial institutions, and both the Black and the Copeland bills are evidences of it

The laws which contain blanks to be filled in by a bureau chief are open to definite possibilities of abuse He stated that the advocates of the Tugwell bill had the protection of the public at heart, and referred to possibilities with the change of officials, their viewpoints may be radically different Mr Hoge concluded by saying "In the final analysis more than a food and drugs law is involved in this question The objection is not primarily an objection to any particular legislation, but to an attitude of mind and the theories of immature idealogists upon which this legislation seems to be based This attitude of

mind disdains the legislative and judicial machinery I concede readily the existence of abuses, defects and miscarriages in our legislative and judicial institutions As a lawyer I deplore them But, I call all to witness that these institutions afford security and safeguards which are inherently necessary if this country is to remain free "

The second speaker for the evening was Mr S L Mayham who spoke about the new food and drug legislation from the standpoint of the cosmetic industry A brief abstract of his address follows

Food and Drug Legislation from the Standpoint of the Cosmetic Industry

ABSTRACT OF AN ADDRESS BY S L MAYHAM

The speaker stated that the Tugwell bill had ceased to be of interest, having been replaced by the Copeland bill, S 2000, and another bill by Congressman Black has been introduced He said that the latter was formulated along the lines of the argument presented by Dr James H Beal at a hearing some time ago He stated that Senator Copeland had failed to make certain changes in which the cosmetic industry is deeply interested The first is a definition of the term "drug " The cosmetic industry is ready to accept regulation but does not want to have its products classified as drugs except where curative claims are made Under the Copeland bill many of the cosmetic products are included The industry also objects to certain definitions applied to an advertisement, being too broad The advertising regulations include all representations of facts or opinion disseminated in any manner by any means This would include house to house canvassers

The speaker said the Copeland bill provides that the name and the place of business of the manufacturer, seller or distributor must appear on every package, but if all this information is necessary there are some packages on which the type of labels would have to be very small He stated that if the definition for antiseptics is required, practically every preparation of that class would have to be provided with a new label The cosmetic industry objects to the licensing provision in the Food and Drugs Act Under publicity, the Copeland bill provides that information shall be disseminated regarding the dangers of certain cosmetics There is a provision in this draft that no person who is a member of the Department of Agriculture or who has a financial interest in the manufacturers' advertising the sale of any food, drug or cosmetics shall be eligible to appointment on the committee provided by the law The speaker contended that under its provisions scientists in the cosmetic and pharmaceutical fields could not serve on the committee, nor any of the technical advertisers serving in that capacity at the present time

The cosmetic industry objects to the definition which includes all substances and preparations other than foods and all diseases to affect a structure or any function of the body of man or animals, also to the provision of the bill which considers cosmetics adulterated if they contain poisonous or deleterious ingredients, likely to be *imminently* dangerous to the user under the condition or use prescribed in the labeling It is the opinion of the cosmetic industry that the word ' imminently" could lead to a great amount of litigation

The speaker stated that the industry had no fear of any trouble arising from restricting dangerous poisons or deleterious ingredients and are interested in seeing such legislation enacted He considered that some changes in the Beal draft should be made The cosmetic industry would prefer to be entirely divorced from the Food and Drugs Act He favored a measure that is fair and satisfactorily protects alike the interests of the consumer and those of the manufacturer

Dr Wharton, of the local Department of Agriculture office, complimented both speakers on their fair and adequate discussion of the proposed legislation, and he expressed regret that Department policy made it impossible for him to take part in the discussion

Dr Fischelis called attention to the fact that the speakers actually brought forward some points in favor of the Tugwell bill He also went on to explain that the power to regulate advertising should be vested in some competent authority Advertising goes before a public not educated in law nor technical points, and many of these statements have a different lay interpretation which is not infrequently misleading Dr Fischelis also pointed out that greater flexibility was required in the law due to rapid changes which take place He especially pointed out the need for controlling radio advertising which reaches so many people at once and so quickly And finally he criticized the industry for not

admitting the inadequacy of the present law when the new was proposed

Since there was no further discussion the meeting adjourned following a rising vote of thanks accorded all speakers

RUDOLF O HAUCK *Secretary*

NORTHERN NEW JERSEY

The Northern New Jersey Branch, of the AMERICAN PHARMACEUTICAL ASSOCIATION, met for its first meeting of the new year on January 15th, in the main building of the Rutgers University College of Pharmacy

After the reading of the minutes, President Little introduced two of our newest members, Albert Hawes and Milton Kahn, who were participating in their first meeting

The Membership Committee then proposed the following individuals for inclusion on our roll Ralph Nacca, James A Bauman, William J Ohland Milton Jungling and George Mitterman They were duly elected

Plans are rapidly being consummated for the joint meetings between the physicians, dentists and the Branch It is hoped that many pharmacists who are not members will attend these sessions and bring their medical and dental friends Mr Mecca, who is in charge of the programs assures us that every minute will be taken up with topics and demonstrations of real interest

Norman Silsby, the first speaker on the new series of 10 minute talks concerning some phase of the profession, read some of the absurd advertising claims made by a manufacturer relative to a product being detailed to physicians He thus illustrated how the doctor is oftentimes made to accept and prescribe inferior medicines solely on the strength of falsely advertised virtues 'The pharmacist should work in closer cooperation with the physician," said Mr Silsby "and forestall these false prophets of therapeutics"

He also compared the cost of detailing to a pharmaceutical house with personal visitations by pharmacists and the relative success of each It would appear, he felt, that the pharmacist has a decided advantage in every way

This entertaining and instructive talk was closed with a reference to the high desirability of a good library of journals and reference texts in the prescription room of every pharmacy

Prof C L Cox, in his report for the committee on the Science and Practice of Pharmacy, touched upon the completion and occupation of the headquarters building in Washington, the work of the new Prescription Protective Bureau, recent explanations of the alcohol regulations, proposed survey of open prescription departments, and the revised Tugwell Bill R W Rodman added a few comments about the various substitute bills which have just been introduced into the two houses of Congress, pointing out as he did so, *the futility of intelligent abstracting of the bills for purposes of brief discussions* such as we were permitted in committee reports This was forcibly driven home by the fact that proponents and opponents in congressional committee sessions, spoke for 4 to 5 hours at a time on the bills

The speaker of the evening James A Bauman, of the State Board of Pharmacy, was then introduced by President Little He discussed the recent State legislation pertaining to the sale of hypnotic drugs, the new prescription laws, and the Board of Pharmacy regulations resulting therefrom

He brought out the fact that some of the Board regulations relative to the prescription law were forerunners of legislation planned to strengthen the professional standing of the pharmacists of New Jersey

The formal discussion finished, Mr Bauman answered many questions of procedure which had been bothering pharmacists since the enactment of the new laws C Graham McCloskey, also a member of the State Board, was present and gladly coöperated with Mr Bauman in handling the flood of questions

We greatly appreciated the presence of these two men and hope that they will bring their colleagues and meet with us often

The meeting adjourned after Mr Rodman had announced that Dr James C Munch of Sharp and Dohme would be the speaker at our next gathering

L W RISING, *Secretary*

NORTHERN OHIO

The regular monthly meeting of the Northern Ohio Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on February 9, 1934 Featured as a dinner meeting in the dining room of the Western Reserve University Faculty Club, it proved to be a very profitable affair for the score or so of prescription pharmacists who were present, besides the faculty members of Western Reserve School of Pharmacy

The first half of the business meeting was taken up by a review of the literature dealing with iron medication Prescription suggestions were approved for use in the makeup type prescriptions to be distributed among the 1400 physicians of the Cleveland Academy of Medicine

The second half of the meeting was given over to reports by members on their recent efforts in detailing physicians The various viewpoints and criticisms of both physicians and pharmacists were made to serve a very useful purpose in the formulation of additional methods of approach

All the members present were highly gratified with the results so far attained Evidence that the initiative shown by the members in detailing physicians will bring results is indicated by the active coöperation of the Cleveland Academy of Medicine and the recent applications for membership to the Northern Ohio Branch of the A Ph A

NEIL T CHAMBERLIN, *Secretary*

NORTHWESTERN BRANCH A PH A

In connection with the Golden Anniversary Meeting of Minnesota Pharmaceutical Association there was held a joint session of the Scientific and Practical Section and the Northwestern Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION

A condensed program of the session follows

Address of chairman, Dean Frederick J Wulling Reports of the following committees College of Pharmacy J L Fitzgerald chairman, Drug Plant Culture G J DeMars, chairman, Practical Pharmacy, J B Slocumb chairman, Professional Standards by A R F Johnson Interprofessional Relationships H H Gregg, Jr , chairman, Research Dr Charles H Rogers, chairman, Hospital Pharmacists Sister St George, chairman U S P and N F Revision, F A Upsher Smith, chairman Adulterations, Rugnar Almin chairman, Public Health, H O Tiegen chairman Fellowship, C T Heller chairman, Rho Chi George Crossen, Historical, Dean F J Wulling, chairman Report of Minnesota Pharmaceutical Educational Conference, F J Wulling College of Pharmacy, University of Minnesota Annual Historical Report F J Wulling Paper on Professional Pharmacy, Theodore A Arneson Iodine Standards Oscar F Muesing Fifty Years of Personal Observation in the Advance of Pharmacy, George Countryman Report on N F Revision Work Gustav Bachman The Pharmacist and the NRA, N Vere Sanders A Paper, George T Kermott The Art of Compounding, David F Jones The Significance of Business History, Willoughby Babcock Another Patent Medicine Era, Joseph Vadheim Report on M S Ph A Fellowship, Karl Goldner A New Deal for American Pharmacy, Anton Hogstad, Jr Biennial Report, College of Pharmacy, University of Minnesota, F J Wulling Historical Pharmacy in Minnesota, F J Wulling Presentation of M S Ph A Scholarship Token, President Anderson The Pharmacognosy of Animal Drugs—A New Field of Pharmacognostical Study, E B Fischer A Paper, Edward Brecht The Influence of Standardizing Agencies in Education, F J Wulling The M S Ph A High Spots—Semi Centennial, F J Wulling Pharmacognostical Investigations of Chrysanthemum Balsamita var Tanacetoides and Chrysanthemum Balsamita (Balsamita vulgaris), E B Fischer A Brief Paper John Connell

A conference of the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy was held on the same day February 15th

PHILADELPHIA

The January meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Temple University School of Pharmacy, on Tuesday evening, January 9th

President Eby called the meeting to order and announced the program as a Symposium on the new Hormone—Tissue Extract

Dr James C Munch, Associate Professor of Pharmacology at the School of Pharmacy Temple University, was introduced, and began a discussion of the preparation and pharmacology of Tissue Extract The following information was brought out in Dr Munch's talk

Tissue Extract is found in the pancreas, liver and kidneys, and is excreted in the urine Before the discovery of this hormone, insulin was sometimes used in the treatment of hypertension but it was found that in extraction of the pancreas an impure insulin was obtained containing some Tissue Extract, and that this, and not the insulin was responsible for the fall in blood pressure

The active principle of Tissue Extract is a vasodilator, and a direct antagonist to epinephrine Its unit value is determined by its

epinephrine-neutralizing effect When epinephrine is injected it produces a constriction of the arteries and a rise in blood-pressure Tissue Extract counteracts this effect One cc of Tissue Extract is standardized to counteract the effect of 0 01 mg of epinephrine

Dr Munch's assistants prepared an anæsthetized dog, its blood-pressure being recorded on a kymograph Epinephrine was injected and the rise in blood-pressure noted Then injections of Tissue Extract were made and the counter effect was apparent on the recording device

President Eby then introduced Dr Joseph B Wolffe Associate Professor of Medicine at the Temple University School of Medicine Dr Wolffe's discussion concerned the clinical phases of the Tissue Extract He spoke of the considerable interest at the present time in various forms of heart disease, especially angina pectoris, or the construction of the coronary artery High blood-pressure comes on gradually, and the arteries are often hardened and blocked before serious symptoms are apparent Angina pectoris is caused by indiscretions in dietary habits, excessive use of tobacco, etc Dr Wolffe has successfully treated causes of angina pectoris with Tissue Extract, and finds that in 55% of the cases clinical relief was obtained, 30% were partially relieved and 15% were failures The hormone is injected intramuscularly or subcutaneously in doses of 2 to 5 cc , each cc representing 10 units

Special diets are used in conjunction with the Tissue Extract, depending upon the type of patient Dr Wolffe's talk was illustrated with a series of lantern slides

The following resolution was presented and adopted

RESOLUTION ON THE DEATH OF JOSEPH W ENGLAND

WHEREAS it has pleased Almighty God to remove by death our Beloved Co-worker and Fellow member, Joseph W England, who died December second, and WHEREAS Mr England served the profession of Pharmacy in many positions of responsibility in both state and national associations, over a period of fifty years, and in his death Pharmacy has lost one who had contributed in many ways to the furtherance of its highest ideals He was a man esteemed professionally by all who knew him He graduated from the Philadelphia College of Pharmacy and Science in 1883 In 1886, he was appointed Chief Pharmacist in the *Philadelphia General Hospital* and in 1900, he became head of the Pharmaceutical Department of the H K Mulford Company He left that position in 1902 to become Scientific Director of Smith, Kline and French Laboratories, Philadelphia He was widely known for his researches in Pharmacy, and was the author of hundreds of original articles of scientific character and many of an historical nature At one time he was a member of the Revision Committee of both the U S P and the N F He served as curator of the Museum of the Philadelphia College of Pharmacy and Science from 1887 to 1920 and had been a trustee of the institution since 1892, and the chairman of the Board since 1924 In 1903 his *Alma Mater* conferred upon him the degree of Master in Pharmacy, *honoris causa* From 1893 until his death, he had served as a member of the Publication Committee of the Philadelphia College of Pharmacy and Science and since 1904 had been recording secretary of its Alumni Association He served as its president in 1891–1892 Other services included the Acting Editorship of the AMERICAN PHARMACEUTICAL ASSOCIATION *Bulletin* in 1910 and 1911, and the chairmanship of the same Association's Committee on Publications He also had been secretary of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION He was the Editor of "The First Century of the Philadelphia College of Pharmacy," a volume widely acclaimed for its accurate and fascinating portrayal of the first one hundred years of this college In 1926, he was president of the Pennsylvania Pharmaceutical Association and in 1921–1922 held the presidency of the Philadelphia Branch A PH A

Resolved, that we express our deep sorrow at his death and extend to his widow and daughter our sincere sympathy in their hour of bereavement

Resolved, that a copy of this resolution be sent to the family, be spread upon our minutes and be sent to the Editor of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

E H MACLAUGHLIN, *Secretary*

PITTSBURGH

The Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION held a well attended meeting Tuesday evening, January 16, 1934 in the main lecture room of the Falk

Clinic The group had the pleasure of hearing John Russell, X-ray technician of the Falk Clinic, Dr W Harry Archer, lecturer in Anesthesia and Exodontia of the School of Dentistry, University of Pittsburgh, and Dr Paul Walker, associate professor of Exodontia and Anesthesia, School of Dentistry, University of Pittsburgh

Clarence T Van Meter presided

John Russell, X ray technician of the Falk Clinic, presented a very interesting and practical demonstration of X ray and Fluoroscopic Technique He showed an instructive film on the manufacture of X ray plates In summarizing his presentation Mr Russell indicated to the group how very important to health is the necessary cooperation between patient and physician when an X ray or fluoroscopic examination is needed The pharmacist can serve in breaking down the idea that there is something mystic or fantastic about X ray and fluoroscopic diagnosis The patient must be brought to the realization that it is a very necessary part of complete medical service when it is ordered by the practitioner

President Van Meter introduced Dr W Harry Archer member of the teaching staff of the School of Dentistry, University of Pittsburgh Dr Archer presented a paper entitled 'A Discussion of Dentifrices and Mouth Antiseptics ' The speaker elected to present the good and bad qualities of certain proprietary articles sold as dentifrices and mouth antiseptics He stated that many dentifrices on the market to day are unnecessarily and irrationally complex in composition The sole function of a dentifrice is to aid in keeping the teeth clean by the removal of food debris by the mechanical use of the tooth brush He cited instances where 'the claim for therapeutic or bacteriostatic virtue of some of the dentifrices on the market to day borders on the ridiculous " He then indicated the formulated provisions of the council of therapeutics of the American Dental Association for the inclusion of dentifrices in Accepted Dental Remedies " Mention was made that, The labors of the council of therapeutics are at present directed toward a control of irresponsible claims made in dentifrice advertising together with the exposure of misbranded and injurious dental nostrums " Dr Archer said

I was pleased to note that the code of ethics of the AMERICAN PHARMACEUTICAL ASSOCIATION deals with the subject of nostrums as follows The pharmacist should uphold the approved legal standards of the United States Pharmacopœia and National Formulary and should as far as possible encourage the use of these drugs and preparations and discourage the use of objectionable nostrums He should not accept agencies for objectionable nostrums nor allow his name to be used in connection with advertisements or correspondence furthering their sale ' A number of agents used to whiten teeth are sold directly to the public at drug stores and department stores In order to make this discussion interesting to you, I made a survey of twenty-five drug stores throughout Metropolitan Pittsburgh, to ascertain what dentifrices were stocked The results were tabulated and I found that, in spite of all publicity given the harmful products six out of every twenty-five, or approximately 25%, stocked one or two of the worst dental nostrums on the market to day I was gratified to learn that the majority when asked what they had for pyorrhea, advised the individual to have the condition treated by a dentist '

The speaker considered the fact that one drug store stocked 28 different kinds of tooth pastes and powders and 13 mouth washes Now it isn't my purpose to tell you how to conduct your business " said Dr Archer but it seemed to me that this pharmacist had a lot of money tied up in seldom called for articles Now where can he start to eliminate and what can he tell his customers when they ask for certain preparations? Obviously he could not use the classical excuse, We do not have that but we do have something better ' I suggest for instance that he could tell a customer who called for a nostrum that he did not stock this product as it has been proved to be injurious to the tooth enamel by authorities and that this code of ethics prohibited him from stocking injurious products " Two benefits would be derived from such a procedure whereby the most glaring nostrums are eliminated from his stock

First His stock of non-essential preparations would be greatly reduced allowing him a larger stock of essential preparations

Second He would be putting into effect the principles of his code of ethics ' At this point the speaker presented the results and findings of investigators of the American Dental Association and cited instances of over medication with such medicaments as Sodium perborate and alkalies

It is disgusting to read in a magazine, or

hear on the radio the wild, exorbitant claims made for some dentifrice, knowing that they are not the result of conscientious, careful research, but the abortive product of some high pressure advertising manager, whose knowledge of dentistry is obtained from a text book on dental diseases

'The leading Dental Schools to day give their students a course in Dental Medicine and Pharmacology At the School of Dentistry, University of Pittsburgh this course covers fully all remedial agents that properly belong to the field of Dental Medicine, includes prescription writing and discusses briefly the most important general remedies available in dental diseases and emergencies The course causes the student to familiarize himself with the dental preparations of the National Formulary During the Junior and Senior years when the clinical work is done in the infirmary these students write prescriptions for their patients which are countersigned by the instructor, and the patient has the prescriptions filled at the school's pharmacy When the students graduate they are equipped with sufficient knowledge to enable them to cooperate intelligently with members of the pharmaceutical profession

The next speaker, Dr W Paul Walker, associate professor of Exodontia University of Pittsburgh School of Dentistry, considered the use of Analgesics Anodynes and Sedatives in Dentistry

Quoting from Dr Walker s paper

'One of the large commercial houses manufacturing a brand of procaine hydrochloride used in local dental anesthesia, quotes from Hippocrates for its advertising slogan 'The Alleviation of Pain is a Sublime Task' We are willing and ready to recognize not only the professional idealism but also the economic value of such an intensely worth while goal as is the prevention of human suffering Since time, indefinitely ancient man has made efforts to alleviate or eliminate pain From the crude aboriginal method of chewing cacao leaves, and allowing the saliva to drip into the open wound, down to the present day multiplicities of anesthetics, sedatives, anodynes analgesiques, hypnotics, etc we follow an ever broadening field of human endeavor and activity It has been because of the scientifically correct use of such medicaments at hand and the constant striving to eliminate the useless and deterrent methods that the science of materia medica therapeutics and pharmacology has advanced so greatly along this line

'Along with the true accomplishments in the discovery and perfection of really valuable drugs and remedies have come also a host of others developed for selfish commercial purposes So many, indeed, have been the preparations perfected that even the most experienced professional man occasionally is lead astray by these modern medicinal gold bricks It is with the thought of upholding a higher ethical standard, in that the worthless be eliminated in favor of the truly valuable, that I enter upon this subject"

Dr Walker then formulated the following classification

1 *Analgesics* — produces insensibility to pain

2 *Anodyne*—relieves or assuages pain

3 *Sedative*—moderates or tranquilizes excitement

In further consideration of his subject Dr Walker indicated how important it is for the prescriber to be thoroughly familiar with the pharmacology posology and toxicology of the drug

The therapeutic classification Dr Walker presented was very complete The official medicinal and remedial agents possessive of the aforementioned therapeutic properties were particularly emphasized Those preparations which are acceptable to the American Dental Association and to the Council of Chemistry and Pharmacy of the American Medical Association were stressed Those to which some objection was raised, were also discussed

In summation Dr Walker is quoted, 'Simplified and rational therapeutics remains a fundamental law in medicine and in dentistry These few drugs namely barbital, phenobarbital, phenacetine, amidopyrine, antipyrine and acetylsalicylic acid etc, have not lost their therapeutic value by the formulation and preparation of so called substitutes It is, of course, necessary that open mindedness be used in considering new remedies of value, but it is of paramount importance that the old and valuable shall not be discarded for some new and questionable It is to be hoped and desired that a conscientious effort on the part of the professional man be evidenced in bringing about this valuable reform, in drug usage and manipulation which is so intensely necessary at this time"

The papers were briefly discussed by Dean C Leonard O'Connell, and an invitation extended to the guest speakers for a joint session of the Pittsburgh Branches of the Dental and Phar-

maceutical Societies It is hoped that this can be arranged soon

On motion, a rising vote of thanks was accorded those who participated in the evening's program

President Van Meter presented to the group Dr George D Beal, Assistant Director of the Mellon Institute of Pittsburgh who has recently been elected to serve as First Vice President of the AMERICAN PHARMACEUTICAL ASSOCIATION Dr Beal acknowledged the introduction

The officers and members of the Pittsburgh Branch were pleased to have as their guest so many members of the student's branch of the Pittsburgh College of Pharmacy A cordial welcome is extended to all pharmacists to participate in the activity of the Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION

FRANK S MCGINNIS, *Reporter*

JOINT PHARMACY MEETING IN BALTIMORE

The Maryland Pharmaceutical Association and the Baltimore Retail Druggists' Association held a joint meeting at the Hotel Emerson, Baltimore February 14th It will long be remembered as a most helpful pharmacy meeting, the attendance was fine and the addresses of unusual brilliance and worth President L V Johnson of the State association, and President Simon Solomon, of the City association presided The afternoon session was devoted entirely to a discussion of business problems

Editor Jerry McQuade delivered a stirring address He covered hurriedly the conditions surrounding the preparation of the retail drug code expressed the feeling that the code was worthless and characterized it as a price cutter's code ' He gave special attention to some very recent developments which are being worked out by manufacturers independent retailers and chains, to bring about a better price situation throughout the country The plan will be under the local supervision of a committee to be selected Mr McQuade expressed himself as convinced that the plan would bring about much sounder business conditions

Nelson A Miller of the United States Department of Commerce, spoke on "The Economic Situation in the Drug Business ' Mr Miller has been associated with the St Louis Drug Store Survey for several months and much of his talk dealt with the facts and figures established by that study One very interesting thing brought out by him was his feeling that business conditions strongly indicate that retail pharmacists may anticipate a pick up in business of 30 to 35 per cent

Prof Marvin Andrews University of Maryland gave an up to date picture of the work being done by the Committee on U S P and N F Publicity of which he is chairman and submitted samples showing the many combinations suitable for prescribing official drugs he also referred to methods of dispensing proprietaries

President Aquilla Jackson of the Local Retail Drug Trade Council, presented a report which was well received which evidenced the confidence of the pharmacists in the members of the Council

The evening meeting was given over to a discussion of professional matters Two valuable addresses were delivered Dr G O S' arrett Cumberland president of the Medical and Chirurgical Faculty of Maryland delivered a most impressive talk It was an earnest candid and fearless talk and went to the very heart of many important problems

Chairman E Fullerton Cook of the Committee on Revision of the United States Pharmacopoeia, discussed the professional phases of pharmacy and gave special attention to the procedure followed in revision work

President Frank L Black, of the Alumni Association School of Pharmacy University of Maryland presided over the evening session

---

Michael Joseph Dausch of Baltimore has been awarded an annual membership in the AMERICAN PHARMACEUTICAL ASSOCIATION following a precedent of former years

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary, 2215 Constitution Ave Washington, D C

LETTER NO 6

February 2, 1934

To the Members of the Council

34 Contract for Printing and Mailing the Journal of the A Ph A for 1934 Motion No 7 (Council Letter No 5 page 65) has been carried and the contract has been awarded to the Mack Printing Company

35 Budget for 1934 Motion No 8 (Council Letter No 5, page 66) has been carried and the budget approved as submitted

36 Selection of Auditors Motion No 9 (Council Letter No 5, page 67) has been carried and the accounts for 1933 are now being audited by W A Johnson & Co

37 Election of Members Motion No 10 (Council Letter No 5, page 67) has been carried and applicants numbered 57 to 74 inclusive are declared elected

38 The Headquarters Building The removal of the offices and records of the ASSOCIATION from 10 W Chase St , Baltimore Md , to the Headquarters Building, 2215 Constitution Ave Washington D C was completed on January third The approach steps have been completed and the work on the grounds is progressing very satisfactorily The widening of Constitution Avenue is completed and the sidewalks will be laid within a short time unless the weather prevents

39 Use of the Text of N F V The following letter has been received from Chairman DuMez of the Committee on Publications

> For the past two decades to my knowledge Gould s Medical Dictionaries have been granted permission to use portions of the text of the National Formulary in the different editions of the dictionaries published by them, so I can see no reason why it is necessary for the Committee on Publications to again vote on this matter I will, therefore recommend that permission to use portions of the text of the National Formulary in the publication of the different editions of Gould's Medical Dictionaries be granted with the understanding that notice of the permission received be printed on the rear of the title page of the books published, and that the ASSOCIATION charge the customary fee of $5 for this privilege "

(*Motion No 11*) *It is moved by DuMez that the P Blakiston's Son & Co , Inc be given permission to use portions of the text of the National Formulary V in the preparation of Gould s Medical Dictionaries, and at the usual charge of $5*

40 American Association for the Advancement of Science The fall meeting for 1933 was held in Boston Mass , Dec 26–29, 1933 Dr John C Krantz, Jr , was appointed Councilor to this association for 1933–1934 by President Swain and attended the meeting as the representative of the AMERICAN PHARMACEUTICAL ASSOCIATION which is affiliated with Section N Medical Sciences

The AMERICAN PHARMACEUTICAL ASSOCIATION, by invitation of the officers of Section N held a joint session with the American College of Dentists on Friday morning as one session of Section N The program follows

Friday Morning Joint Session with the AMERICAN PHARMACEUTICAL ASSOCIATION and the American College of Dentists December 29 1933, 9 00, John Ware Hall Boston Medical Library, 8 The Fenway

John C Krantz, Jr , Second Vice President AMERICAN PHARMACEUTICAL ASSOCIATION, Presiding

1 "Pharmacy and Dentistry in Therapeutic Progress" Harold S Smith, chairman, and Samuel M Gordon secretary, Council on Dental Therapeutics American Dental Association

2 "An Investigation of the Viburnums and Their Medical Aspects" Heber W Youngken, Massachusetts College of Pharmacy

3 "Certain Scientific Aspects of Pharmacopœia Making" E Fullerton Cook, chairman of the Committee of Revision of the United States Pharmacopœia

4 "The Determination of Magnesium by Alkalimetric Titration" Milan A Logan Forsyth Dental Infirmary for Children and Harvard Medical School

Dr Krantz reports that the joint session was well attended and that the papers and their discussion were very interesting This is the first time that the AMERICAN PHARMACEUTICAL ASSOCIATION has participated in a program and the fine cooperation of Drs Krantz, Youngken and Cook is acknowledged No doubt but that this step will lead to a closer contact with the A A A S and its interest in the work of the AMERICAN PHARMACEUTICAL ASSOCIATION and in the scientific work being done in pharmacy is very encouraging

41 American Joint Committee on Horticultural Nomenclature Dr Heber W Youngken submits the following report

"I attended the meeting of the American Joint Committee on Horticultural Nomenclature held for the purpose of planning the revision of *Standardized Plant Names* at the Hotel New Yorker New York City on January 15th, and took an active part in the two sessions of this organization

"I shall prepare a detailed report of the proceedings of this meeting as a part of my annual report of the Committee on Horticultural Nomenclature to be submitted to the House of Delegates of our ASSOCIATION at its coming meeting in Washington However, for the present information of the President, the Council and yourself I am pleased to state it was voted to revise and enlarge the scope of *Standardized Plant Names* so as to include the scientific and common name of every plant yielding a drug spice or dye in American commerce as well as some other economic products, and your committeemen present were requested to submit a complete list of the common names of medicinal plants which the AMERICAN PHARMACEUTICAL ASSOCIATION desires included in the revision of this work The delegates present representing all but one of the constituent organizations showed marked interest in the problems of American Pharmacy as related to the work of standardizing plant names especially synonyms, and officers and members alike appeared desirous of granting our requests for changes and additions to the present work, which will extend its usefulness to the entire drug trade

I feel convinced that if all the plans for the revision of that work are carried out which were adopted at the meeting of January 16th the edition will prove a classic work on standardized plant names, and its adoption as such by a greatly increased clientele is anticipated The present work has already become the standard for plant names covered in a number of organizations and in the Dept of Agriculture"

Dr Youngken was authorized to attend this meeting by President Swain with the approval of Chairman Hilton of the Council

42 Buckram Binding for N F VI In order to secure the cloth required for the binding of Series A 25,000 copies of the N F VI before the advance in price, the Mack Printing Co purchased the cloth in July 1933, and will store it without charge until used They also printed and bound and have carried in stock about 2000 copies of the N F V for more than a year, to prevent an advance in price They now request that the ASSOCIATION give a three months note for the total amount $2587 43—$1026 for cloth and $1561 43 for N F V—to be reduced each three months as convenient The U S P made a similar arrangement for the cloth required

This suggested arrangement has the approval of Chairman Hilton of the Council

(Motion No 12) It is moved by Chairman Swain of the Committee on Finance that the secretary and treasurer be authorized to execute a note, payable in three months to the Mack Printing

Company, Easton, Pa , for $2587 43, with interest, and to renew the note, with reductions, as may be necessary

43 Applicants for Membership The following applications properly endorsed and accompanied by the first year's dues have been received

No 75 W H Treiber, Enter Square, Emmitsburg, Md , No 76, L B Lathroum, 735 E 20th St , Baltimore, Md , No 77, A A M Dewing, Centerville, Md , No 78, Charles William Abbott, North Pacific College of Oregon, Portland, Ore , No 79 Samuel Harold Culter, 1 Park Ave , Tuckahoe, N Y , No 80, Sister Agnes FitzSimmons, 16th St & Girard Ave , Phila , Pa , No 81 Edith A Kramer, 2308 N Fulton Ave , Baltimore, Md , No 82, W Wallace Smith, 125 N Howard St Baltimore, Md No 83, Ralph C Dudrow, Hyattsville, Md , No 84, H O Wicks, 7401 Harford Road Baltimore, Md , No 85, Frank C Purdum, 5500 Harford Rd , Baltimore, Md , No 86 S F Pettis, Canton, Mississippi, No 87, A Lester Batie, Laurel, Md , No 88 W H Clark, Market St , Pocomoke City, Md , No 89, H O Trowbridge, Kensington Md , No 90, Robert A Pilson, Main St , New Windsor, Md , No 91, W G Bridges, 1726 Hountted Rd , Columbus, Georgia, No 92, Howard B Lewis, 218 W Medical Bldg , U of Mich , Ann Arbor Mich , No 93 Albert William Lewing, 310 Erkenbrecher Ave , Cincinnati, Ohio, No 94 Marion D Falconer, 223 E Alberta, Anaheim, Calif , No 95 John F O'Brien 365 Winton Rd , Rochester, N Y , No 96 Gleb Alexander Popoff, 1453 7th Ave Apt No 2 San Franciso, Calif No 97, Henry E Kleinsorge, Jr , 1439 5th Ave , San Francisco, Calif , No 98, Jerome Royal Fletcher, 860 Ashbury St , San Francisco, Calif , No 99, Weshe Wilson Brown 398 Hayes St San Francisco Calif , No 100, Hoffmann Henry Siebe, 133 A Carl, San Francisco, Calif , No 101 Paul Lantrip, 1704 Alabama Ave , Jasper, Alabama, No 102, Chester Mearl Hauck, 9389 Courvile St , Detroit, Mich , No 103 Ernest Berger, First Nat'l Bank Bldg , Tampa, Florida No 104 Samuel Schwartz, 600 E 169th St , New York, N Y , No 105, Ina Lorene Griffith, Faculty Exchange, Norman, Okla No 106 Minoru Masuda, 506½ Maynard Ave , Seattle, Wash No 107 Faheem Minhail, American Mission Hospital Assiut, Egypt, No 108, Lawrence Davis, 10 354 12th St Detroit Mich , No 109, Manasset Kaprielian, Rue Vahr, Beirut, Syria, No 110 Sister Mary Adelaide 1026 Belmont Ave , Youngstown, Ohio, No 111 Everette A McArthur % Parke Davis & Co , Detroit, Mich , No 112, William J Ohland 17 Durrell St Verona, N J , No 113 Charles Albert Hudson 148 S Court St , Luray Va , No 114, Meyer Harry Goldberg, 1246 Broadway Lorain, Ohio, No 115, Norman Carl Fretthold 1547 Rosewood Ave Lake Wood, Ohio, No 116 Joseph Huber, 541 E 124th St , Cleveland, Ohio No 117, Roger K Lager, 2298 Murray Hill Rd , Cleveland, Ohio, No 118 Walter Anthony Knurek 1603 Copassett Ave Lakewood, Ohio, No 119 Nicholas Avellone 2362 E 79th St , Cleveland Ohio No 120, George B Merriam, White Sulphur Springs, W Va No 121 Carl C Caplan 1800 Penna Ave Baltimore, Md No 122, B M Brown, Lyons Georgia, No 123, R M Birely St Paul & 33rd Sts , Baltimore Md , No 124 Godfrey D Kroopnick 930 Whitelock St Baltimore, Md , No 125 Irving Freed 930 Whitelock St Baltimore, Md , No 126 Howard Hollingsworth College Sta Box 37 Pullman Wash , No 127, John Russell Vibber, College Sta , Box 668 Pullman, Wash , No 128, William Tombari College Sta Box 356 Pullman Wash , No 129 Maison Gabriel de Navarre, 12,206 Mendota Ave Detroit, Mich , No 130 Elvira Marjorie Silveira 3820 Shafter Ave Oakland, Calif , No 131, John H Beeler Vinton Louisiana

(*Motion No 13*) *Vote on Applications for membership in the American Pharmaceutical Association*

E F Kelly *Secretary*

LETTER NO 7

February 2, 1934

To the Members of the Council

44 Time of the 1934 Meeting Since the Madison meeting, careful consideration has been given to the best time for the Washington meeting and for the dedication of the Headquarters Building

The Government has been engaged in a number of improvements in the area surrounding our site which, unless completed, would have interfered with the dedicatory exercises These are either completed or are so far advanced as to be finished by April first

Due to the open weather the grading and topsoiling of our grounds are practically completed and a good part of the planting The remainder of this work will be completed by April first, probably earlier It is therefore now assured that these matters will not interfere

The District of Columbia Pharmaceutical Association has taken great interest in the arrangements for the meeting and is giving splendid cooperation through its officers and members The local organization is prepared to arrange for the meeting either in the spring or later

Chairman Dunning has favored holding the meeting in the spring, as expressed in the letter from him quoted below, but his recommendation could not be laid before the Council until the matters referred to above were satisfactorily adjusted Dr Dunning's letter is as follows

> "I consider it of the utmost importance that the dedication of the American Pharmaceutical Headquarters Building takes place in the spring of the year, preferably during the month of May and that the American Pharmaceutical Association Convention should take place at the same time The building was occupied and began to operate in January You will realize that when the building is opened to the public and to our membership and those especially interested in the work of our ASSOCIATION it will be difficult to maintain enthusiastic interest over a considerable period of time Many of those whom we wish to interest in making subscriptions to the necessary building fund especially those whom we hope will make substantial donations will have seen the building accepted it and will have, by fall, lost the first flush of their interest It seems obvious that the occupancy of the building should be quickly followed by its dedication and, thereby, avoiding any possible loss of enthusiasm and interest among those whom we are hopeful will provide the necessary funds to complete financial security
>
> "There should be no more difficulty in arranging for the meeting of the ASSOCIATION in the spring of 1935 than has been occasioned in having the meeting take place simultaneously with the Annual Special Convention at the same time of the year
>
> "I hope that the Council will approve my recommendation I would consider it most unfortunate if they did not

Dr Dunning also requested that emphasis be placed on the fact that more satisfactory arrangements for the dedication can be made in the spring when many of those whom we wish to have present, *including Government officials* will be in Washington

In the mean time, the views of the A A C P and of the N A B P were requested Chairman Jordan consulted the Executive Committee of the A A C P The concensus of opinion was in favor of the usual time for the meeting late in August or early in September and that a meeting in May will seriously interfere with the attendance from the colleges and also with the program of the A A C P The following is the closing paragraph of the last letter received from Chairman Jordan

> 'I think I have sent you enough of these comments to let you know that the school men are very much opposed to an early meeting and I think you can see why this is true I sincerely hope and trust that arrangements can be made that will be satisfactory to you and that will not call for a meeting prior to June 15th"

A meeting late in June would bring serious conflict with the annual meetings of a number of state associations which occur late in that month

President Gilbert and Secretary Christensen of the N A B P, express the belief that a May meeting will lessen the attendance from the boards and will interfere with their program

The general expression of opinion as secured from a number of individuals consulted, is that a meeting in May would be favored largely because of the dedication of the building and that the latter consideration should be paramount in reaching a decision for this year A number also favor a meeting in May in Washington because of weather conditions and because the City is more beautiful at that time than later

Satisfactory hotel and other arrangements can be made for the week of May 7th–12th which will be the most satisfactory time for the meeting if May is selected as these dates will conflict

least with the colleges of pharmacy and the boards, and corresponds to the time at which the U S P Convention is held

(*Motion No 14*) *It is moved by Dunning that the Eighty Second annual meeting of the A Ph A and affiliated organizations be held during the week of May 7 to 12, 1934*

In view of the necessity for an early decision, the chairman of the Council has approved the calling of a vote at this time If there is objection or if any member of the Council desires to comment the vote will be considered as tentative

E F KELLY, *Secretary*

REPORT OF THE CHAIRMAN OF THE COMMITTEE ON PATENTS AND TRADE-MARKS *

BY F E STEWART, CHAIRMAN

The time has come for me to resign as chairman of the Committee on Patents and Trademarks after many years of service in that capacity However, before doing so, I may be of service in calling attention to some of the important points that have been developed in relation to these laws as applied to pharmacy Attention has been repeatedly called to the fact that the object of the patent laws as defined in the Constitution of the United States is to promote progress in science and useful arts ' I do not believe that any person who is informed on the subject will contend that the patent laws of the United States as now applied to pharmacy have promoted progress in the science of the materia medica and related and mutually dependent arts of pharmacy and pharmaco-therapy The law requires that to be patentable an alleged invention must be an invention in fact and that the application for patent grant must 'contain a written description of the invention and of the manner of making constructing, compounding and using it, in such full, clear concise and exact terms as to enable any person skilled in the art or science to construct and use the same " It is perfectly evident that materia medica patents are granted by the Commissioners of Patents without complying with this requirement The patent law also requires that Every patent shall contain a short title or description of the invention or discovery, correctly indicating its nature and design Is this requirement complied with? And there are other important requirements Are they complied with? Send to the Patent Office for a copy of any patent relating to the materia medica and find out Copies can be obtained at the cost of a few cents And, if you find that these and other requirements demanded by the patent law have not been complied with remember that the patent is void and can be revoked You will find by referring to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, Vol 20, No 1 January 1931, the report of our committee in which these and other requirements for obtaining patents are stated For the sake of all concerned pharmacy therapeutics, pharmaco therapeutic literature the U S Pharmacopœia, the educational institutions related to pharmacy and medicine, the practitioners of medicine and pharmacy and the public health, why not investigate the methods of the Patent Office in regard to the patenting of materia medica products and preparations and force the Patent Office to comply with scientific professional and legal requirements in relation to the granting of patents for medical and pharmaceutical inventions

And the same relates also, to the registering of trade marks Refer for information on the requirements of the trade mark law to the same report of our committee Find out what these requirements are and force the Patent Office to comply with them There is no use for you to consult your lawyers about it Consult 'Browne on Trade marks" and find out for yourselves what is required Consult first the report of this committee and then read up in Browne s excellent work on the subject After you have posted yourselves in this matter then appoint a disinterested committee of pharmacists and physicians and reputable manufacturing pharmacists for further study and consideration of the subject and then decide how best to force the powers that be to play square with all concerned

A vote of appreciation for his long and useful services was given Dr Stewart

---

* Madison meeting A PH A 1933

EIGHTY-SECOND ANNUAL MEETING, AMERICAN PHARMACEUTICAL ASSOCIATION AND AFFILIATED ORGANIZATIONS AND DEDICATION OF THE AMERICAN INSTITUTE OF PHARMACY, WASHINGTON, D C—MAY 7–12, 1934

The Council of the AMERICAN PHARMACEUTICAL ASSOCIATION has approved May 7th–12th as the dates for this important meeting because it is desirable to have the dedication exercises as promptly as possible, and at this time which corresponds to that of the U S P Convention it is probable that many of those whom it is desired to have present including Government officials will be in Washington The city is at its best at this period and very satisfactory hotel and traveling rates are being granted

The Government will have completed very extensive improvements in the area surrounding the Institute including the widening of Constitution Avenue to eighty feet and the intersecting streets are being repaved The grading and planting of the grounds will be completed early in the spring and the Building is now being furnished and equipped

Everything will be in readiness for this very noteworthy occasion for American Pharmacy when its permanent home and headquarters will be dedicated and when important plans will be considered for the work to be carried on in the Institute

The members of the District of Columbia Pharmaceutical Association will act as hosts to the visiting pharmacists and their families and friends The general committee of arrangements headed by President Paul Pearson of the District Association, is completing arrangements for the business and entertainment features of the program The Local Secretary the Headquarters Hotel and the hotel and transportation rates will be announced at an early date

In addition to the Meeting and the Dedicatory Exercises, Washington is unusually interesting and enjoyable to visitors at this time Congress will probably be in session all public buildings will be open and the splendid improvements made in recent years in your Capital City will be well worth seeing The improvements completed and in operation in the Lincoln Memorial section emphasize what a wonderful site the American Institute of Pharmacy occupies It should make every American pharmacist prouder of his calling because Pharmacy has such a commanding position for its headquarters and a building in full keeping with the splendid surroundings

---

FOOD, DRUG AND COSMETIC LEGISLATION

Nothing definite can be said regarding the outcome of food drug and cosmetic legislation now in Congress Senator Copeland modified the bill introduced by him it was referred to a sub committee and considered later by the Senate Commerce committee As a result, it is reported that Senator Copeland will revise his bill and a hearing will be held February 27th 10 00 A M briefs may be filed prior to that hour The announced plan is to limit the witnesses to five one to speak on general food and drug legislation and one representing each of the four groups Foods drugs cosmetics and advertisers Each group will assemble material and designate a speaker to present its argument

Senator Stephens and Congressman Black are sponsors for the Drug Trade Conference bill, Representative Virginia E Jenckes of Indiana has introduced the bill prepared by Charles Wesley Dunn

The hearing on February 27th will bring about a discussion of important points as viewed by the administration and of those not fully in agreement therewith It is to be hoped that the hearing will develop an acceptable measure or supply information which will enable Congress to amend the present law or enact a new measure It is not helpful to comment further at this time nor of great value to discuss features of the proposals The proposed bills have brought out constructive thoughts but in some respects have complicated the proposed legislation the importance of which deserves rational accord and not needless discord

Several speakers discussed the legislation before New York Branch AMERICAN PHARMACEUTICAL ASSOCIATION, abstracts of these discussions appear in this issue of the JOURNAL

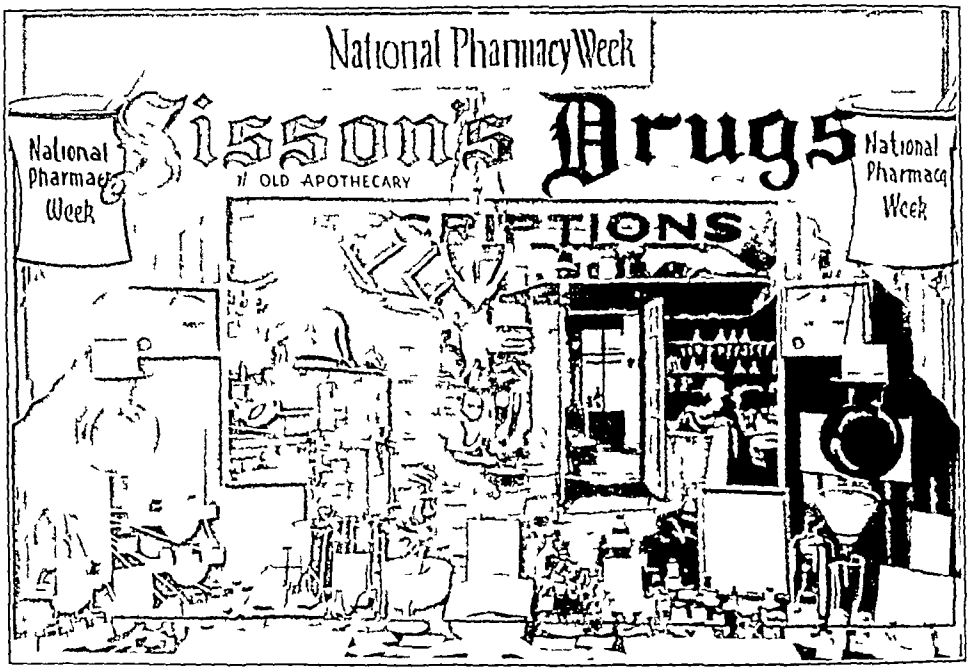
BALTIMORE BRANCH A PH A

The February meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held at the Hotel Emerson on Tuesday February 27th

John A Strevig, of the Eli Lilly and Company, Indianapolis will present a sound film on "The Production and Clinical Application of *Insulin*"

PRIZE-WINNING PHARMACY WEEK WINDOW, 1933

The background of the window will be recognized as the "famous misnamed picture" described in the March JOURNAL for 1931, pages 236–246 entitled, "The Laboratory," from an



The Prize Winning Window, Pharmacy Week 1933

engraving by J D Murray of a painting by William Hunt At the left the sources of drugs are shown by connecting specimens with the globe In the picture are utensils used in prescription work and a dosage illustration is made by showing a bottle of Solution of Magnesium Citrate and a 1/400th grain of aconitine

Different forms of administration are shown and the foreground refers to a prescription from the Bible of the year 1491 B C , which gives the ingredients for an anointing oil

Mr Sisson's certificate and other personal records are displayed in the window

After completing the high school course in Schuyler, Nebraska, Mr Sisson entered the Chicago College of Pharmacy and graduated in 1894 In 1898, he opened a pharmacy at 5034 Cottage Grove Ave , Chicago later, he established a pharmacy on the second floor of 841 E 63rd St

Mr Sisson holds membership in national state and local associations and takes an active part in U S P and N F revision He keeps in touch with the Chicago Medical Society and during the time of the Pharmacy Exhibit at The Century of Progress" he gave his services for a day or more of each week

O U SISSON

He adheres to ethical advertising that embodies accurate and truthful statements He believes in giving credit to his employees for the work they do, thus, in a letter he refers to the part which two of his assistants had in making the window display, namely, Rollin Reineck and L B Jobusch

Mr and Mrs Sisson have two sons and a daughter The former are attending the Armour Institute and the daughter is a student at the University of Chicago

EDITORIAL NOTES

OPPORTUNITIES FOR PHARMACEUTICAL ORGANIZATIONS TO SHARE IN THE HEADQUARTERS

Chairman H A B Dunning in his address at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, referring to the progress of the American Institute of Pharmacy, said

'Three State associations have contributed special funds for designated purposes The Texas Pharmaceutical Association for furnishing the offices of the Editor, the Maryland Pharmaceutical Association for furnishing the offices of the Secretary, and the Kansas Pharmaceutical Association have not as yet decided for what their fund is to be used Suitable acknowledgment will be made of these splendid contributions and it is hoped that the other state associations will make contributions for special purposes, thus emphasizing the close relations between them and the AMERICAN PHARMACEUTICAL ASSOCIATION and associating the name of each of them with the project"

The dedication of the Headquarters and the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in Washington will bring ideas forward for sharing in the great work for American pharmacy It is hoped also to have complete sets of state and national proceedings, laws applying to pharmacy histories of early pharmacy, photographs of pharmacists who had a part in the development of pharmacy Individuals have copies of rare and old books which may serve a larger purpose if made part of the library or museum

CODE AUTHORITIES' CONFERENCE

A Code Authorities' Conference will convene in Washington, March 5th–8th President Roosevelt will address the first session, followed by Administrator Johnson The opening meeting will be held in Constitution Hall, among the considerations are named the possibilities of increasing employment, protections against destructive competition and excessive prices and monopolistic tendencies the elimination of inequalities and inconsistencies in codes the position of small enterprises and the many problems of code administration

In his invitation the Administrator asked for information concerning the effects of codes on operations, including employment in each industry on general price trends of products in each industry, and on unethical trade practices, as well as the effects of code provisions if any restricting production through limitation of machine hours or plant facilities, and the effect of codes on smaller concerns in each of the industries

In addition the invitation solicits suggestions to be presented during the conference for the modification, elimination or addition of specific code provisions, proposals for the elimination of overlapping of codes and for the financing of industry code administration

REPORT OF THE BUREAU OF NARCOTICS

The report of the Bureau of Narcotics has been issued in booklet form Editorial comment was made on page 278 of the April JOURNAL 1933, on 'The Narcotic Control Agreement' and in the July issue, page 596, on "The Ratification of the Narcotics Limitation Congress" President Franklin D Roosevelt has signed the agreement ratifying the Convention of Geneva on Narcotic Drugs

The comments referred to speak in a general way of this great work in control of the narcotic evil, to lessen the number of habitues and impress the harmfulness of misuse of narcotics and the report testifies to the possibilities of coöperation in public health matters Commissioner H J Anslinger has been doing effective work and on a number of occasions has spoken in appreciation of the cooperation of pharmacists

TONICS

A meeting of the Guild of Public Pharmacists (Great Britain) was held on January 17th Mr H N Linstead (secretary of the British Pharmaceutical Society) in the chair There was a large attendance to hear Dr J H Burn give a lecture on The Pharmacological Action of Some Well Known Drugs Professor Burn dealt in a most interesting manner with various drugs used as tonics and diuretics The word tonic he said was in common use not only among laymen but also among pharmacists and doctors it was therefore of interest to consider what was meant by a word which was used in many different senses Substances so varied as gentian, strychnine adrenaline alcohol thyroid and vitamin B might all be classed as tonics, and even then the list was incomplete When the heart was removed from the body and made to beat by saline infusions the application of strychnine had no effect The beat of the heart in the body was improved by strychnine, but to understand this one must consider the connection of the heart with the arterial system '

REVISION OF BRITISH PHARMACEUTICAL CODEX

Under the direction of the council of the Pharmaceutical Society of Great Britain reports are being issued preliminary to revising sections of the British Pharmaceutical Codex The report of the pharmacy sub committee presents a summary of the principal new or revised formulas recommended by it for inclusion in the revision The sub committee recommends the inclusion of formulas for a number of preparations from earlier pharmacopœias which are not included in the British Pharmacopœia of 1932, but are still in more or less frequent demand

THE NEW SWISS PHARMACOPŒIA

The new Swiss Pharmacopœia omitted 108 articles from the previous edition and has added 304 new articles they include chemicals that are now required in medical practice Very few drugs of animal origin have been officially recognized

The Swiss government signed the international agreement for the unification of the formulas of potent drugs with reservations permitting the Swiss Pharmacopœial Committee to deviate from the strengths of galenical preparations laid down in the agreement and also permitting variations in the nomenclature required by the agreement Nineteen articles of the Pharmacopœia differ from the requirements of the international agreement

The general principles of nomenclature of the previous pharmacopœia are followed In some instances the British and the United States pharmacopœias have been drawn upon for titles Standards for seventy drugs of formulas officially recognized are included Vegetable drugs are carefully described, but only few biological tests have been adopted, for digitalis, the digitoxin chemical test is given

THE ESSENTIAL OILS OF THE SWISS PHARMACOPŒIA

Ernest J Parry in the *Chemist and Druggist* states 'there are twenty seven essential oils described in the fifth edition of the Swiss Pharmacopœia Their description is preceded by a general monograph headed 'Olea Aetherea,' which purports to give a general account of their more usual adulterants But treatment of this kind is not suitable for such a work nor is it of any very practical value in most cases For example turpentine is to be detected by the formation of pinene nitroso chloride in the fraction boiling at 155–156° But all that this really does is to identify the pinene present which is a natural constituent of many essential oils Nor are the solubility specific gravity, boiling point and levorotation of sufficient value to indicate the use of gurjun balsam, copaiba or cedarwood oils as adulterants Chloroform and benzene can hardly be said to be adulterants of essential oils and need not have been mentioned Refractive indices are not quoted for the oils "

PERSONAL AND NEWS ITEMS

The *Deutsche Medizinische Wochenschrift* has entered on its 60th year, the occasion is celebrated by a special number which included the *Deutsches Tuberkulose Blatt*

The Rotary Club at Austin Texas, owns the home in which O Henry" lived for a number of years Various patriotic organizations, including the Daughters of the American Revolution, the Daughters of 1812 and the Daughters of the Republic of Texas have pledged themselves to gather O Henry relics to be installed in this one of William Sidney Porter's many homes

It was in Morely Bros Pharmacy where a counter blotter was found in which O Henry had written one of his earlier (unpublished) stories

Prof Freeman P Stroup is successor to the late Joseph W England as recording secretary of the Alumni Association of the Philadelphia College of Pharmacy and Science

Dr Eugene Maier has been appointed chief bacteriologist of the Merck Institute of Therapeutic Research, Rahway, N J He was formerly Research Assistant in the Rockefeller Institute and also bacteriologist at Bellevue Hospital, department of pathology

Dr A Richard Bliss, Jr, director of The Research Laboratories of The William A, Webster Company, Pharmaceutical Manufacturers, became vice president of the Company on February 6, 1934

Dr Robert W Morrison, formerly Associate Professor of Pharmacology in the University of South Carolina, is now assistant to the Director of Research of the William A Webster Company

George H Needham, fellow-member A PH A, in San Francisco, has been giving evening courses in microscopy and photomicrography, participated in by pharmaceutical, food and industrial chemists He is to address the San Francisco Teachers' Association on Critical Microscopy '

Robert L Swain, of the AMERICAN PHARMACEUTICAL ASSOCIATION, will deliver the "Founders' Day Address ' at the Philadelphia College of Pharmacy and Science, Februarv 23rd He is to receive the Ph M degree, *honoris causa*

The names of the ten men who stood highest in the vote of 4106 druggists on "What ten men make biggest news in the drug field? conducted by the *American Druggist,* are Carl Weeks, H V Arny John W Dargavel J H Beal, Wheeler Sammons John H Goode Louis K Liggett, W Bruce Philip, Charles H LaWall and E F Kelly Forty one hundred and six druggists voted

Samuel C Henry, former secretary of the N A R D, has been named a member of the Review Advisory Board by National Recovery Administrator Hugh S Johnson This Board is to observe the effect of NRA codes upon small enterprises The Board will meet for the first time February 26th

Walter G Hodge has been appointed national director of distribution for the William S Merrell Company, Cincinnati

Attention is directed to page 17 of an opening for a pharmaceutical chemist

TEMPLE UNIVERSITY GOLDEN ANNIVERSARY

Temple University, of Philadelphia, celebrated its fiftieth anniversary during the week of February 11th The University has a wonderful history As is well known, Russell H Conwell was its founder and the spirit which moved him in this undertaking has resulted in an institution of which Philadelphia may well be proud A memorial address was delivered on Sunday (February 11th), by Rev Dr N Joseph Toomey in the auditorium of the Temple Following this a presentation of the Conwell bust, by Boris Blai, was made in the great court of Mitten Memorial Hall

During the week displays of medical, dental and pharmaceutical products were open to the public, galenicals and processes were exhibited in the laboratories of the School of Pharmacy

On Wednesday, February 14th, there was a reception by the officers and directors of the pharmacy Alumni Association to the graduates and undergraduates of the School of Pharmacy At night there was a faculty and alumni banquet to guests and delegates from universities, colleges and associations The address was delivered by the Hon R S Copeland, U S Senator from New York

A Founders' Day celebration was held on Thursday, when the principal address was made by Dr Glenn S Frank, president of the University of Wisconsin

The late Dr John R Minehart, former dean of the School of Pharmacy was for many years an active member of the AMERICAN PHARMACEUTICAL ASSOCIATION

Dr H Evert Kendig is now the dean of the School of Pharmacy

DRUG-CHEMICAL DINNER

Reservations for the ninth annual dinner of the drug and chemical trades, to be held March 8th in the Waldorf-Astoria, New York City, under the direction of the Drug Chemical and Allied Trades Section of the New York Board of Trade, are now twice those of a year ago, according to Joseph Huisking, chairman of the reception committee and head of the drive intended to make attendance cross the 1000 mark this year Postmaster General James A Farley will be the principal speaker and plans call for broadcasting his speech over a national network beginning at ten o'clock

OBITUARY

L C BRENNER

L C Brenner, 42nd president of the Texas Pharmaceutical Association, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died January 22nd, at Memorial Hospital, Houston, Tex

The deceased was born at Wiesbaden, Germany February 5, 1863 After graduating from the Real Gymnasium, Wiesbaden, he entered the chemical laboratory of Prof Dr R Fresenius and a year later entered the Polytechnicum at Karlsruhe where he studied pharmaceutical chemistry graduating in 1884 In 1885 he came to San Antonio to visit his brother For a time, thereafter, he was employed in New Orleans and New York City coming back to Texas he opened a pharmacy at Belmont, which he operated successfully for three years and then disposed of it to engage in the drug business with J C Bright at Gonzales, subsequently, the firm of Brenner and Bright was consolidated with the firm of Peck & Fly under the name of Gonzales Drug Company of which in 1912 he became the sole owner

Mr Brenner was prominently connected with pharmaceutical organization work for more than a quarter of a century He took an interest in civic affairs served as alderman of Gonzales and for 15 years was president of its school board He was a member of the Masonic bodies in which he held presiding offices The funeral ceremonies at his home, in Gonzales, were largely attended

The deceased is survived by his widow, six children and nine grandchildren

E B HEIMSTREET

E B Heimstreet died December 16th, at his home in Lake Mills, Wis, after an illness of several weeks aged 85 years He was born at Lansingburg, N Y, January 3, 1818

Mr Heimstreet was largely responsible for the organization of the Wisconsin Pharmaceutical Association, serving as secretary for 32 years, and was a former president and secretary of the Wisconsin Board of Pharmacy He formerly operated stores in Jamesville and Palmyra and was associated with his son, Charles F, in a drug store in Lake Mills until he retired in 1925 He attended the Madison meeting of the A Ph A

Dr Edward Wight Washburn, chief chemist of the Bureau of Standards, died suddenly at his home in Washington February 6th, of heart failure He was a leader in research on the so called 'heavy water," and was the first to produce water containing high concentrations of the hydrogen isotype in considerable quantity, by the electrolytic method He was author of "Principles of Physical Chemistry," published in 1915 and of many research papers

---

SOCIETIES AND COLLEGES

AMERICAN PHARMACEUTICAL ASSOCIATION meets in Washington during week of May 7th

SCIENTIFIC SECTION, A PH A

Due to the earlier Convention date this year it will be necessary for those desiring to present papers before the Scientific Section to submit the title and a short abstract to the secretary several months earlier than usual Please give this matter your prompt attention so that a copy of the completed paper will be in the secretary's hands on or before the opening date of the Convention The officers of the Section desire your continued cooperation

F E BIBBINS, *Chairman*, Indianapolis
R L ROWE, *Secretary*,
c/o Parke, Davis & Co, Detroit, Mich

SECTION ON PRACTICAL PHARMACY AND DISPENSING

FIRST CALL FOR PAPERS

The First Call for Papers, Addresses, etc, to be presented before this Section is addressed to all those interested in the advancement of Practical Pharmacy As a fitting part of the ceremonies of dedicating the Headquarters Building of the ASSOCIATION, this year's meeting will be particularly important Therefore every professional pharmacist is cordially invited to take part in making this an outstanding series of sessions

All titles and abstracts should be forwarded to the secretary as promptly as possible so as to be listed in the program

M J ANDREWS, *Chairman*
R E TERRY, *Secretary*
715 S Wood St, Chicago, Illinois

CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

To the Secretaries of State Pharmaceutical Associations

"Our next Conference will be held at the time of the meeting of the A PH A in Washington, D C You will have within the next few days copy of proposed questions for discussion, and it is hoped that each of you may find it possible to attend this Conference and take an active part in the proceedings and render your aid in making it possible for this Conference to accomplish the things of which it may be capable"

ROBERT C WILSON, *President*
CARL G A HARRING, *Secretary*
20 Glen Road Newton Center, Mass

SECTION ON HISTORICAL PHARMACY

The Historical Section of the AMERICAN PHARMACEUTICAL ASSOCIATION earnestly seeks the help and cooperation of its friends in preparing the historical program for the approaching annual meetings of the ASSOCIATION to be held in Washington

This meeting will mark the beginning of a new epoch in American pharmacy We are making history faster than we realize Our task is to record it just as accurately and as interestingly as possible

The present forward trends in pharmacy of necessity, rest upon the past Every phase of pharmacy which has transpired, although but yesterday, is history The story of your store, your apprenticeship, your local or state association would make interesting history Let us have it

Few professions afford so many angles of interest, for the writer, as does pharmacy You are asked to contribute to the Archives of American Pharmacy now housed in the new Headquarters Building in Washington

LOUIS GERSHENFELD, *Chairman*
C O LEE, *Secretary*,
Purdue University, Lafayette, Ind

SECTION ON EDUCATION AND LEGISLATION, A PH A

With the annual meeting occurring earlier than usual this year, the preparation of a program should begin at once To this end the officers of this Section are anxious to secure papers dealing with educational and legislative topics The success of our meetings depends upon an interesting program and this in turn requires the cooperation of the members A subsequent notice will contain suggestions as to topics but this does not preclude papers on other subjects within the scope of the Section The joint session with the Conferences of Law Enforcement Officials and State Association Secretaries will be continued and we hope that reports from all states will be received

Send your title to the secretary at an early date and make this meeting in the national capitol one befitting the dedication of our head quarters building

G C SCHICKS, *Chairman*
C W BALLARD *Secretary*,
115 W 68th Street, New York, N Y

STATE PHARMACEUTICAL ASSOCIATION MEETINGS, FEBRUARY TO MAY

Florida—at Daytona Beach, May 29th–31st
Illinois—May 15th–17th at LaSalle, Ill
Iowa—in Sioux City, February 21st–22nd
Kansas—in Salina, April 10th–12th
Louisiana—in New Orleans, May 12th–19th
Minnesota—in Minneapolis, February 13th–16th
Missouri—in Kansas City, April 24th–26th
Nebraska—in Omaha, May 7th–9th
Oklahoma—in Oklahoma City, April 17th–19th
Texas—in Mineral Wells in May, date not fixed

William D Thomas, druggist, of Hoosick Falls, N Y, has been elected to Congress for the twenty-ninth New York District

William D Jones has been appointed acting Postmaster of Jacksonville, Fla

NEW MEXICO PHARMACEUTICAL ASSOCIATION

New Mexico Pharmaceutical Association will meet May 23rd–24th, in Santa Fe The convention city was founded by the Spanish in 1605, but it has a prior history as an ancient Indian village, only St Augustine can claim rivalry in point of years It is anticipated that the meeting will be largely attended, the New Mexico Board of Pharmacy will meet May 21st and 22nd prospective candidates should address G H Sasser, secretary of the Board for application blanks

PROFESSIONAL PHARMACY EXHIBIT AT OKLAHOMA PHARMACEUTICAL ASSOCIATION

Oklahoma Pharmaceutical Association will hold its annual session in Oklahoma City in April A comprehensive professional pharmacy exhibit will be an interesting feature similar to the one featured at the convention of the Wisconsin Pharmaceutical Association in Milwaukee

BOSTON DRUG SHOW

The first Drug Show Health Fair and Beauty Bazaar ever held in New England is scheduled during the first week in April at the Mechanics Building in Boston A large number of the retail drug leaders of New England are lending their support to the show and the sponsorship of Governor Joseph B Ely of Massachusetts has been secured

HISTORY OF BOSTON DRUGGISTS ASSOCIATION

Walter R Dolliver has prepared a short history of Boston Druggists Association in booklet form Many names familiar to members of the AMERICAN PHARMACEUTICAL ASSOCIATION are included among those who have been and are active in the ASSOCIATION

DRUGGISTS CONGRESS IN CONNECTICUT

Druggists from all parts of Connecticut attended the first Pharmaceutical Congress and Exposition of the Alumni Association of the Connecticut College of Pharmacy at Hotel Taft in New Haven Ethical and commercial phases of the relation of the pharmacist to the public were considered and speakers and exhibits emphasized the strides made in the compounding of drugs

Dr Milton C Winternitz, dean of the Yale School of Medicine, stressed the close relationship between pharmacy and medicine in the early days of both professions and urged the cooperation of the pharmacists

FREE ANALYTICAL SERVICE GIVEN BY PHARMACY SCHOOL

Druggists throughout the state of Oregon are the beneficiaries of a unique service maintained for them at the State College here under the direction of Prof Lewis C Britt of the Oregon State College of Pharmacy A free analytical laboratory has been in operation right on the campus of the College since 1927, to assist Oregon pharmacists in keeping their drugs up to the highest standard of purity

The pharmacists claim that this is perhaps as close an example of coöperation between registered pharmacy and a college of pharmacy as the profession can show anywhere Dr Britt closely collaborates with Linn E Jones, secretary of the Oregon Board of Pharmacy, by whom all samples submitted by druggists for analysis must be approved As the state has no pure drug law the laboratory offers the only means of determining the purity of drugs not sold in the original unbroken packages The laboratory was established through the efforts of the Oregon State Board of Pharmacy

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS

New Orleans has been selected for the 1934 meeting of the N A R D Dates September 24th–29th Thomas S Smith, of Wilmington, Del has been appointed member of the Executive Committee succeeding Ambrose Hunsberger of Philadelphia

NINTH INTERNATIONAL CONGRESS OF CHEMISTRY

The ninth International Congress of Pure and Applied Chemistry will meet in Madrid, April 5th to 11th A program has been arranged for April 3rd to 24th, giving those who attend an opportunity to visit interesting places of Spain

NEW JERSEY BOARD OF PHARMACY

Examinations for applicants for the Registered Pharmacist Certificate will be held by the Board of Pharmacy of the state of New Jersey on Thursday April 19th at the State House, Trenton, according to an announcement from the Board Office

All applications for the examination must be filed with the Secretary of the Board, 28 W State St Trenton, not later than March 19th

UTILIZING FARM WASTE

The Iowa State College has completed a new research laboratory devoted to the study of problems in connection with work on waste material such as corn cobs, hulls etc

CHEMICAL MANUFACTURING CODE

The basic code for chemical manufacturing prepared and advanced by the Chemical Alliance, was approved by the President, February 10th

LEGAL AND LEGISLATIVE

CODE CONFERENCE

President Roosevelt will address what probably will be the greatest gathering of leaders of industry and trade in the country's history—the conference of Code Authorities and trade association committees scheduled to be held in Washington, March 5th to March 8th

In his call for the conference, the opening sessions of which are to be held in Constitution Hall, General Johnson outlined the major purposes to include the consideration in public sessions of the possibilities of increasing employment protections against destructive competition and against excessive prices and monopolistic tendencies, the elimination of inequalities and inconsistencies in codes, the position of small enterprises, and the vast problem of code administration and the organization of industry for self-government "

ALTERATION OF LOSS LIMIT CLAUSE

It is expected that a hearing will be called At that time the druggists will be permitted to put in all the evidence they have tending to show the inadequacy of a small markup At the same time it is expected that a compromise proposal which has been worked out in the NRA will be presented for the druggists consideration

Just what this compromise proposal will be could not be learned at this writing, but it was expected that it would be made public when formal announcement of the hearing was made It is understood that the hearing will cover only the loss limitation provision of the retail drug code and will not affect the food code or the general retail code

MODEL STATE NRA LAW

Administrator Hugh S Johnson has made public a "model" State industrial recovery act which has been submitted to governors together with a diplomatically worded letter pointing out that NRA is deeply interested' in the passage of measures for cooperation with the Federal law and for elimination of conflicts Just how far the proposal could be advanced this year is not clear Relatively few states have regular sessions of legislatures in the even numbered years and while special sessions were set for this year in several some of these already have been held Twelve states to date have enacted NRA cooperative legislation New York, New Jersey Virginia, Ohio, Texas, California, Utah, Colorado, Wisconsin, Kansas, Massachusetts and Washington

Though the Administrator's idea looks toward the eventual continuance of codes past the emergency period the present proposal is purely an emergency plan worded to expire with the Federal industrial act, using as a preamble a declaration of state wide emergency similar in nature to the Congressional declaration on which the National Industrial Recovery Act is founded

The immediate problem which calls for state assistance is twofold A number of Federal judges hearing the relatively few cases so far in court have declared Congress cannot delegate power to regulate business which is not interstate Machinery for 100 per cent Federal enforcement might prove as cumbersome as prohibition enforcement, in the opinion of NRA officials

ONLY MEDICINE IS CALLED "GOOD FOR HEALTH" IN TEXAS

Only medicines and drugs can be labeled as good for the health, ' under a new ruling recently made by the Texas Pure Food and Drug Division of the State Health Department This means that advertising and window displays cannot include the statement that the product is 'Good for Your Health," or a similar statement

In view of this ruling bakeries in the state which are selling a wheat bread advertised as ' Good for Your Health," will be barred from continuing such advertising It is the opinion of the Pure Food and Drug Division that ingredients of bread and food do not belong in class of health remedies and so cannot bear "health" labels

MAIL-ORDER HOUSES OPPOSE PRICE FIXING

On February 17th, leading mail order houses placed before General Johnson a comprehensive study of price fixing under codes of fair competition and called upon him to eliminate provisions which compel manufacturers to post for the notice of all competitors current and future prices

The representatives suggested that collection and dissemination of current price information should be done by NRA administrators

and not by the industry itself through its code authority

VIRGINIA LEGISLATION

Liquor Control Act—H R 33, passed the House on February 1st, will allow druggists to sell whisky on prescription, but they must buy liquor supplies from control board stores Bay Rum must be sold on prescription It does not control wines and beer of 3 2% or less alcoholic content

Virginia Trades Practice Act does not define cost,' but an interesting provision makes cut prices unlawful if they tend to substantially lessen competition or unfairly injure a competitor

Fair Trade Practice Bill makes it unlawful to sell merchandise below cost, and defines cost" for the retailer as the invoice price or price paid for the goods plus overhead

VALIDITY OF 20 YEAR-OLD PRICE DISCRIMINATION IN UTAH

Attorney General Joseph Chez of Utah has brought suit against Safeway Stores, Inc, grocery chain, which will serve as a test of the validity of a twenty year old Utah law said never to have been argued in court

The suit alleges that the grocery firm did unlawfully and intentionally for the purpose of destroying the competition of an established dealer in similar commodity, to discriminate between different sections within Salt Lake City by selling commodities in one section lower than the price charged for such commodities in another section "

While the case does not involve drug stores, the test is being watched eagerly by druggists because of its application to drug price cutters who use similar tactics

NEW JERSEY STATE CODE

Under leadership of the New Jersey State Pharmaceutical Association, pharmacies, drug stores and other types of retailers handling drugs are cooperating to draw up a retail drug code for the state of New Jersey to offer greater protection than does the Federal code

This action is taken under a law passed by the New Jersey Legislature and approved by the Governor last September, giving the Governor power to set up within the state codes of fair ethics for different lines of business, similar to the power held by the President under the NRA This law says that the state codes may be approved by the Governor provided they are consistent with the federal codes, but "due regard, however, may be had for local conditions and local customs "

DRUGGIST S LICENSE SUSPENDED

License of a New York City pharmacist alleged to have been apprehended imitating a well known proprietary drug has been suspended by the New York State Board of Pharmacy, George W Mather, secretary, announces He states that drastic action was taken in this case because it was found that the pharmacist in question was manufacturing the imitation product himself Suspension is of indefinite duration, and the board can restore the license or permanently revoke it, as it sees fit

PHARMACISTS ASK REORGANIZATION OF MISSISSIPPI BOARD

A bill to reorganize the Mississippi board of pharmacy and strengthen the old law governing the profession of pharmacy in this state has been approved by the House Committee Under the new bill there is authorized an executive officer, who is secretary of the Board, to be charged with investigating the complaints against pharmacists with authority to employ counsel The new bill provides for a Board of Pharmacy of four members appointed by the governor from a list of twenty one submitted by the State Pharmaceutical Association The executive officer is to be nominated by the association and appointed by the governor

TREATY SERIES NO 863—NARCOTIC DRUGS

Editorial comment was made in the July number of the JOURNAL, page 596, on the ratification of the Narcotics Limitation Convention The transactions covering this important action is published in pamphlet form and may be obtained from the Superintendent of Documents, Government Printing Office Washington, D C, for 50 cents

---

We are in receipt of a souvenir booklet of the incorporation of Dartford as a municipal borough on September 13, 1933 Here the Wellcome chemical and galenical works are located The booklet is finely illustrated and bound, containing views of Dartford and an insignia of the Lord Mayor of London presenting the charter together with the official blazon of the borough of Dartford

BOOK NOTICES AND REVIEWS

Handbook of Chemotherapy By DR VIKTOR FISCHL, Departmental Director of the Schering Kahlbaum A G, Berlin, and PROF HANS SCHLOSSBERGER, Member of the Reich Board of Health, Berlin-Dahlem English translation by Dr A S Schwartzman H G Roebuck & Son, Publishers, Baltimore, 1933 410 pages Price $8 00

This English translation of the "Handbook of Chemotherapy" will undoubtedly be considered by all those engaged either directly or indirectly in pharmacological research as one of the most interesting and important recent publications of its kind The term chemotherapy as employed by the authors is the broader and more logical one introduced by a number of modern authors in opposition to the old and restricted word, *chemotherapy* which Ehrlich applied to the treatment of a few specific blood infections by intravenous injection of certain chemicals, which was expected to result in a *therapia sterilisans magna* There is no valid reason in modern experimental pharmacology and therapeutics for not applying the term chemotherapy to any and every clear-cut pharmacological effect produced by a definite chemical compound on a specific physiological function, and this is the sense in which the word is employed by Fischl and Schlossberger in their important work, the first volume of which is now available in English This volume of the 'Handbook of Chemotherapy" deals with the so-called 'metal-free" organic compounds producing specific pharmacological effects After a brief introduction, to which are appended references to the general literature on chemotherapy Chapter 1 begins with the acyclic chlorine compounds Chloroform, carbon tetrachloride and other chlorinated compounds are discussed in this chapter, and a description is given of their action in relation to their chemical structure Chapter 2 deals with the unsaturated fatty acids Here the reader will meet many drugs with which he is familiar and also numerous chemical derivatives from the plant world of which he has probably never heard before Thus, for instance, in addition to cod liver oil and its derivatives and the chemistry of chaulmoogra in all its ramifications he will be confronted by such substances as margosa oil, achaoti oil nastin, gamelan and a host of synthetic chemicals related to the various natural products described in this chapter A third chapter deals with simple benzol and naphthalin derivatives as well as with oxy- and oxo compounds In this section we have a discussion of the salicylates, the phenols, various anthelmintics and other compounds from the standpoint of chemotherapy and chemopharmacodynamic relationships Chapter 4 contains a short description of the amino acids succeeded by twenty-four pages devoted to the chemotherapeutic discussion of all the quinolin derivatives except quinine In this series are found descriptions of Fourneau 710, plasmochin, various amino quinolins, atophan and many other compounds Chapter 6 contains a complete discussion of quinin and its derivatives, universally regarded as among the most brilliant achievements of modern chemotherapeutic research The seventh chapter is devoted to emetin and its derivatives and here as is the case throughout the book, a resume is given not only of the pure chemistry but also of the pharmacology, toxicology and therapeutic data concerning the respective compounds Chapter 8 is devoted to a large variety of plant stuffs, including numerous glucosides and alkaloids, anthelmintics, antimalarial and antidysenteric substances Chapter 9 discusses the acridin derivatives, while Chapter 10 describes dyestuffs of every conceivable structure except those which contain metals Here we find a thorough consideration of the nitro and nitroso dyestuffs, such as picric acid and naphthol green, of azo dyestuffs, such as chrysoidin, trypan red, trypan blue and afridol blue, of the carbonium dyestuffs, such as malachite green, auramin, brilliant green, fuchsin, methyl violet, gentian violet and the eosins, of the azin dyestuffs, such as safranin, and of the oxazin and thiazin dyestuffs, including methylene blue Chapter 11 deals with certain colorless urea derivatives and particularly with the historical germanin, otherwise known as Bayer 205 Fourneau 309, naganol and moranyl, and the final chapter contains a brief discussion from a chemotherapeutic point of view, of blood serum of men and of certain types of apes

The first volume of the English edition of the "Handbook of Chemotherapy" excels in its physical make up the print being remarkably clear and legible, the paper of very fine quality and the binding of durable character Among the invaluable features of this work are the numerous and exceptionally clear formulas of

and not by the industry itself through its code authority

VIRGINIA LEGISLATION

Liquor Control Act—H R 33, passed the House on February 1st, will allow druggists to sell whisky on prescription, but they must buy liquor supplies from control board stores Bay Rum must be sold on prescription It does not control wines and beer of 3 2% or less alcoholic content

Virginia Trades Practice Act does not define cost ' but an interesting provision makes cut prices unlawful if they tend to substantially lessen competition or unfairly injure a competitor

Fair Trade Practice Bill makes it unlawful to sell merchandise below cost, and defines cost" for the retailer as the invoice price or price paid for the goods plus overhead

VALIDITY OF 20 YEAR-OLD PRICE DISCRIMINATION IN UTAH

Attorney General Joseph Chez of Utah has brought suit against Safeway Stores, Inc , grocery chain which will serve as a test of the validity of a twenty year old Utah law said never to have been argued in court

The suit alleges that the grocery firm did unlawfully and intentionally for the purpose of destroying the competition of an established dealer in similar commodity, to discriminate between different sections within Salt Lake City by selling commodities in one section lower than the price charged for such commodities in another section

While the case does not involve drug stores, the test is being watched eagerly by druggists because of its application to drug price cutters who use similar tactics

NEW JERSEY STATE CODE

Under leadership of the New Jersey State Pharmaceutical Association, pharmacies, drug stores and other types of retailers handling drugs are cooperating to draw up a retail drug code for the state of New Jersey to offer greater protection than does the Federal code

This action is taken under a law passed by the New Jersey Legislature and approved by the Governor last September, giving the Governor power to set up within the state codes of fair ethics for different lines of business similar to the power held by the President under the NRA This law says that the state codes may be approved by the Governor provided they are consistent with the federal codes, but ' due regard, however, may be had for local conditions and local customs "

DRUGGIST S LICENSE SUSPENDED

License of a New York City pharmacist alleged to have been apprehended imitating a well known proprietary drug has been suspended by the New York State Board of Pharmacy George W Mather, secretary, announces He states that drastic action was taken in this case because it was found that the pharmacist in question was manufacturing the imitation product himself Suspension is of indefinite duration and the board can restore the license or permanently revoke it, as it sees fit

PHARMACISTS ASK REORGANIZATION OF MISSISSIPPI BOARD

A bill to reorganize the Mississippi board of pharmacy and strengthen the old law governing the profession of pharmacy in this state has been approved by the House Committee Under the new bill there is authorized an executive officer, who is secretary of the Board to be charged with investigating the complaints against pharmacists with authority to employ counsel The new bill provides for a Board of Pharmacy of four members appointed by the governor from a list of twenty-one submitted by the State Pharmaceutical Association The executive officer is to be nominated by the association and appointed by the governor

TREATY SERIES NO 863—NARCOTIC DRUGS

Editorial comment was made in the July number of the JOURNAL, page 596, on the ratification of the Narcotics Limitation Convention The transactions covering this important action is published in pamphlet form and may be obtained from the Superintendent of Documents, Government Printing Office Washington, D C for 50 cents

---

We are in receipt of a souvenir booklet of the incorporation of Dartford as a municipal borough on September 13, 1933 Here the Wellcome chemical and galenical works are located The booklet is finely illustrated and bound, containing views of Dartford and an insignia of the Lord Mayor of London presenting the charter together with the official blazon of the borough of Dartford

BOOK NOTICES AND REVIEWS

Handbook of Chemotherapy By DR VIKTOR FISCHL, Departmental Director of the Schering Kahlbaum A G, Berlin, and PROF HANS SCHLOSSBERGER, Member of the Reich Board of Health, Berlin-Dahlem English translation by Dr A S Schwartzman H G Roebuck & Son, Publishers, Baltimore, 1933 410 pages Price $8 00

This English translation of the "Handbook of Chemotherapy" will undoubtedly be considered by all those engaged either directly or indirectly in pharmacological research as one of the most interesting and important recent publications of its kind The term chemotherapy, as employed by the authors, is the broader and more logical one introduced by a number of modern authors in opposition to the old and restricted word, *chemotherapy* which Ehrlich applied to the treatment of a few specific blood infections by intravenous injection of certain chemicals, which was expected to result in a *therapia sterilisans magna* There is no valid reason in modern experimental pharmacology and therapeutics for not applying the term chemotherapy to any and every clear-cut pharmacological effect produced by a definite chemical compound on a specific physiological function, and this is the sense in which the word is employed by Fischl and Schlossberger in their important work, the first volume of which is now available in English This volume of the "Handbook of Chemotherapy" deals with the so-called metal-free" organic compounds producing specific pharmacological effects After a brief introduction, to which are appended references to the general literature on chemotherapy, Chapter 1 begins with the acyclic chlorine compounds Chloroform, carbon tetrachloride and other chlorinated compounds are discussed in this chapter and a description is given of their action in relation to their chemical structure Chapter 2 deals with the unsaturated fatty acids Here the reader will meet many drugs with which he is familiar and also numerous chemical derivatives from the plant world of which he has probably never heard before Thus, for instance in addition to cod liver oil and its derivatives and the chemistry of chaulmoogra in all its ramifications he will be confronted by such substances as margosa oil, achaoti oil, nastin, gamelan, and a host of synthetic chemicals related to the various natural products described in this chapter A third chapter deals with simple benzol and naphthalin derivatives as well as with oxy- and oxo compounds In this section we have a discussion of the salicylates, the phenols, various anthelmintics and other compounds from the standpoint of chemotherapy and chemopharmacodynamic relationships Chapter 4 contains a short description of the amino acids, succeeded by twenty-four pages devoted to the chemotherapeutic discussion of all the quinolin derivatives except quinine In this series are found descriptions of Fourneau 710, plasmochin various amino quinolins, atophan and many other compounds Chapter 6 contains a complete discussion of quinin and its derivatives, universally regarded as among the most brilliant achievements of modern chemotherapeutic research The seventh chapter is devoted to emetin and its derivatives and here as is the case throughout the book, a resumé is given not only of the pure chemistry but also of the pharmacology, toxicology and therapeutic data concerning the respective compounds Chapter 8 is devoted to a large variety of plant stuffs, including numerous glucosides and alkaloids, anthelmintics, anti malarial and antidysenteric substances Chapter 9 discusses the acridin derivatives, while Chapter 10 describes dyestuffs of every conceivable structure except those which contain metals Here we find a thorough consideration of the nitro and nitroso dyestuffs, such as picric acid and naphthol green, of azo dyestuffs, such as chrysoidin, trypan red, trypan blue and afridol blue of the carbonium dyestuffs, such as malachite green, auramin, brilliant green, fuchsin, methyl violet, gentian violet and the eosins, of the azin dyestuffs, such as safranin, and of the oxazin and thiazin dyestuffs, including methylene blue Chapter 11 deals with certain colorless urea derivatives and particularly with the historical germanin, otherwise known as Bayer 205 Fourneau 309, naganol and moranyl, and the final chapter contains a brief discussion from a chemotherapeutic point of view, of blood serum of men and of certain types of apes

The first volume of the English edition of the Handbook of Chemotherapy" excels in its physical make up, the print being remarkably clear and legible, the paper of very fine quality and the binding of durable character Among the invaluable features of this work are the numerous and exceptionally clear formulas of

all the complicated compounds that must be discussed in any book on chemotherapy Many excellent tables also add to the value of the book At the end of each chapter appears an exhaustive bibliography, a conspicuous feature of any such reference work as the volume be fore us It is to be hoped that H G Roebuck and Son, the American publishers who have made this significant venture will receive sufficient encouragement from those interested in the advancement of pharmacology and pharmaceutical chemistry to induce them to publish the translation of the other two volumes of the 'Handbook of Chemotherapy a set of which together with an appropriate index should have its place among the books of all investigators in this field —DAVID I MACHT

The following reprints have been received from the Wellcome Chemical Research Labo ratories

The Alkaloids of Picralima Klaineana Pierre, Part II,' by T A Henry

'Apparatus for Continuous Extraction by Chloroform " by H Paget

Echitamine in Alstonia Barks ' by J A Goodson

The Composition of Modern Quinetum ' by J A Goodson and T A Henry

"Apparatus for Quantitative Catalytic Re duction," by H Paget and W Solomon

"Bases Derived from Some Substituted Propenylbenzenes with a Note on the Prepa ration of Pure Methylamine," by T M Sharp and W Solomon

Experiments on Antimony Compounds Used in the Treatment of Bilharzia Disease and Kala-Azar," by W H Gray and J W Trevan

Reprint from *Annales de l'Institut Pasteur* has been published on ' The Control of Cordage and Cat Guts " The authors are A Goris and A Liot

AMERICAN CHEMICAL SOCIETY

The American Chemical Society will hold its 87th meeting in St Petersburg, Fla , March 25th–30th Dean Townes R Leigh, of the College of Arts and Sciences is the general chairman of the convention, he was formerly dean of the College of Pharmacy reorganized in 1933 as a School of Pharmacy in the College of Arts and Sciences, B V Christensen is the director

The Florida Medicinal Plant Garden is operated under the supervision of the Depart ment of Pharmacognosy School of Pharmacy University of Florida Dean Leigh was presi dent of the American Association of Colleges of Pharmacy 1931–1932

Texas Pharmaceutical Association will probably change its time of meeting to June 18th–21st the place remains the same namely Mineral Wells Tex

The Copeland bill S 2800 replaces former bills by Senator Copeland Its purpose is to displace the present Act hearing on this bill will be held Tuesday, February 27th

---

DRUG STORES IN CUBA REOPEN AND PHARMACEUTICAL TRADE BECOMES NORMAL

On January 24th, retail drug stores in Havana reopened, and the medical strike (which in cluded nurses, hospital attendants, pharmacists, dentists, laboratory workers, undertakers—in fact, all branches of public health workers and professionals) was brought to a close with the signing of an agreement between the secretary of the Department of Health and the officials of the Medical Federation This agreement, based on 24 demands served to stop the strike which had left the island without health service except for serious emergency cases All drug stores were closed, but it was stated that the Federation would permit the filling of prescriptions in certain cases which they considered urgent —Assistant Trade Commissioner Kathleen Molesworth Havana

---

Dr Wolfgang Schnellbach noted the abstract published in the January JOURNAL on page 30 and refers to an article by him in the *American Journal of Pharmacy* for February 1929, on page 127 entitled Yeast Extract I Have Known and Satisfactory Applied Mass Excipient " The abstract published in the January number is from the *Weekblad* reference to which is given

We are glad to call attention to the article by Dr Schnellbach

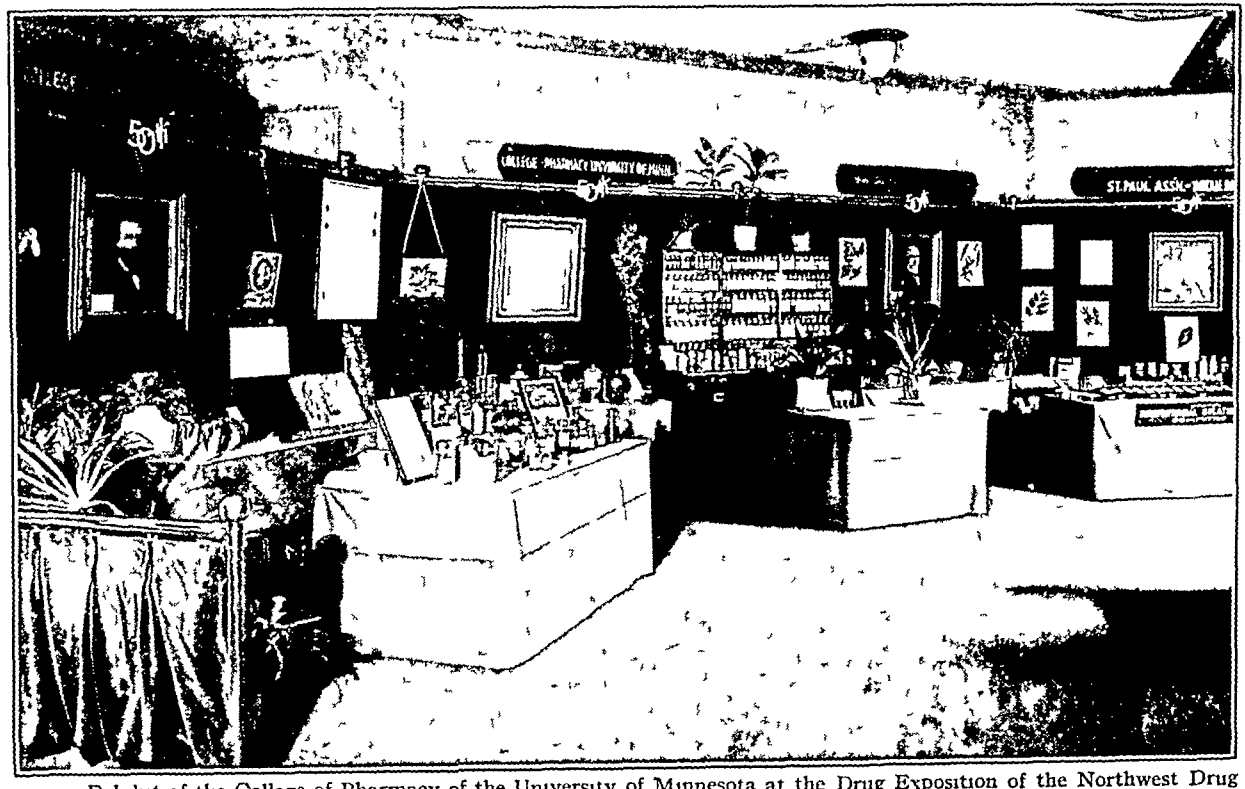


Exhibit of the College of Pharmacy of the University of Minnesota at the Drug Exposition of the Northwest Drug Bureau in the Municipal Auditorium, Minneapolis February 13 to 16, 1934 on the occasion of the Golden Anniversary of the Minnesota Pharmaceutical Association

FREDERICK J WULLING

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII MARCH 1934 No 3

FREDERICK J WULLING

Frederick John Wulling, president of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1916–1917, has been dean and member of the faculty of the College of Pharmacy of the University of Minnesota for more than forty years He was born in Brooklyn, N Y , December 24, 1866, the son of John J and Louise C (Munz) Wulling In 1883, he graduated from Carlstadt, N J , high school, after completing a course of study in a business college, he matriculated at Columbia University College of Pharmacy and graduated in 1887 Following graduation, the young man was named Associate Editor of the *Pharmaceutical Record*, in which capacity he served until 1891, when he accepted place as member of the faculty of Brooklyn College of Pharmacy

In 1892, Professor Wulling was elected member of the faculty and dean of the College of Pharmacy, University of Minnesota, and when, under his direction, the Medicinal Plant Garden was established he was named director During the War this garden contributed a great service by supplying standardized Tincture of Digitalis While an outstanding purpose of the garden is to cooperate with medicine and pharmacy in the educational promotions of the University and for the student bodies of these divisions, Dr Wulling brings its message to the citizens of Minnesota by acquainting them with native useful as well as dangerous or poisonous plants The University outlook and purpose is presented in radio and other addresses by the Dean for general information of the public in which the importance of professional pharmacy is stressed

Among the honors and degrees which Professor Wulling has received are Pharm D and LL B , University of Minnesota, Ph M , Philadelphia College of Pharmacy and Science, honorary Sc D , Columbia University He was trustee of the U S Pharmacopœial Convention 1920–1930, president of the American Conference of Pharmaceutical Faculties, 1914–1915, chairman of the Minnesota Academy of Sciences, 1910, is director of the Minneapolis Society of Fine Arts, fellow of the American Association for the Advancement of Sciences, and various literary

and social clubs, honorary member of New Jersey Pharmaceutical Association, member of Minnesota Pharmaceutical Association, and presides over the session of its scientific and practical pharmacy section at its meeting with Northwestern Branch A PH A

He is author of "Evolution of Botany," 1891, "Medical and Pharmaceutical Chemistry, 1894, "Chemistry of the Carbon Compounds," 1900, "Course in Law,' 1908

Dr Wulling married Miss Lucille Truth Gissel, of Brooklyn, in 1897, they have one son, Emerson G Wulling This sketch has been prompted by a service as dean of the pharmacy faculty of the University of Minnesota, covering a period of more than four decades

---

SIR HENRY WELLCOME, REMINGTON MEDALIST FOR 1934

Secretary Hugo H Schaefer, on March 16th, announced the vote of Remington Honor Medal Committee, naming Sir Henry Wellcome as Remington Medalist for 1934 The recipient has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1875, a sketch is printed on page 573 of the July JOURNAL, 1925, see also January number, 1932, page 88, July, pages 644, 647

Mr Wellcome was knighted by King George and has been elected fellow of the Royal College of Surgeons He is the second person, not holding a medical degree, aside from members of the Royal Family, thus honored, the other recipient was Field Marshall Lord Roberts

His monumental sanitary work in various parts of the world is referred to at this time, because his report to the Secretary of War resulted in a greatly increased Government support of the methods and operations of General Gorgas in Panama He is director of the Gorgas Memorial Institute of Tropical and Preventive Medicine, Washington, which operates scientific laboratories at Panama for research relating to causes and prevention of tropical diseases

Sir Henry is a native of Wisconsin and a graduate of the Philadelphia College of Pharmacy The late Dr Frederick B Power[1] was director of the Wellcome Chemical Research Laboratories in London

On account of the lateness of publication the sketch of Sir Henry and outline of his activities will have to be deferred to the April issue of the JOURNAL

LOCAL COMMITTEES FOR THE 82ND ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION IN WASHINGTON D C, WEEK OF MAY 7TH

Headquarters—Hotel Shoreham

Local Secretary, Frank A Delgado 1620 Fuller St, N W, Washington D C

Convention Committee Paul Pearson, *Chairman,* I B Campbell, M G Goldstein, G W Mathews B A Smyser, J G Biggs *Treasurer* T A Moskey, *Secretary,* A F Gorsuch

Chairman of Sub-Committees *Womens* Mrs T A Moskey Mrs T B Campbell *Entertainment,* W P Herbst *Dedication,* S L Hilton

Auxiliary State Committees *Delaware,* Thomas S Smith *Chairman* Thomas Donaldson, J W Wise, Albert Dougherty, A S Williams *Maryland* S Y Harris, *Chairman* R E L Williamson L V Johnson Simon Solomon, F L Black *Virginia,* A L I Winne *Chairman,* N Guy Miller, H C Littlejohn E P Berwyn, W G Crockett *West Virginia,* J Lester Hayman, *Chairman,* C V Selby, G O Young R B Cook, E K Hoge

[1] For sketch of Dr Frederick Power—see June JOURNAL, 1922, page 403

EDITORIAL

E G EBERLE EDITOR 2215 Constitution Ave , WASHINGTON, D C

A CORDIAL WELCOME

THE time and place for the 1934 meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION—Washington, May 7th to 12th—were selected to accord with the plans for dedicating the Headquarters Building The occupancy of this building which with other structures that may later be erected on the site will be known as the American Institute of Pharmacy, is one of the most important events in the long history of the ASSOCIATION and marks the successful completion of the most extensive and far-reaching effort the ASSOCIATION has undertaken The site, the building and the surroundings are beyond the expectations even of those who have been most active in the undertaking, and it is difficult to forecast the helpful influence which the institute will exert in the years to come American pharmacy now occupies its home and will be equipped to more effectively carry forward those activities which contribute to a stronger profession and to a better pharmaceutical service for the public

Every branch of pharmacy has had a part in this movement and thousands of individuals and organizations have contributed of their time and thought and money Its success is a distinct credit to the profession and to the industry, and is a striking example of what can be accomplished through cooperation With such a splendid foundation and equipment, even greater results may be expected and pharmacy should take its rightful place among the professions which safeguard the public health

The dedication exercises which will be held at the building on Wednesday morning, May ninth, will be simple and impressive With this exception, the usual program for the meeting will be carried out at the Shoreham Hotel which has been selected as the headquarters

The National Conference on Pharmaceutical Research will hold its sessions on Saturday, the fifth, in the afternoon and evening The American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy will meet Monday and Tuesday The joint banquet will be given on Tuesday evening and the regular program of the AMERICAN PHARMACEUTICAL ASSOCIATION will occupy the remainder of the week, closing Friday evening Saturday will be devoted to a sight-seeing trip around Washington, Arlington, Alexandria and Mt Vernon

The members of the District of Columbia Pharmaceutical Association will be the hosts Ample accommodations are available and a splendid program of entertainment is provided The Capital City is at its best at this time and all the points of interest will be open

A cordial invitation is extended to our members, to every one who contributed to the Headquarters Building, and others interested in the progress of Pharmacy, to attend the meeting and particularly the dedication on May ninth It is impossible to send a special invitation to every one and our earnest desire is that no one should fail to understand that the invitation is all-inclusive of those interested — ROBERT L SWAIN *President*

THE NRA MAY STRESS THE DRUGGISTS' RESPONSIBILITIES AND POINT TO THE WAY FOR IMPROVING DRUG STORE PRACTICE

THE codes which apply to the administration of the NRA have impressed the fact that greater efforts must be made to bring pharmacy forward in the average drug store and more careful consideration must be given to the sales in a drug store and the means of promoting them A very important question for druggists is associated with obtaining their share of the spending power of the public, but to derive it from sales that do not belittle them by selection and quality of side-lines The drug store has had the prestige of pharmacy and this may be obscured if not lost, if too much stress is placed on price, by reducing standard products to uneconomic levels, selling varied sundries and offering unwarranted premiums to attract patronage The public has always looked to the druggist for quality, accuracy and service—a valuation that may be lowered if a majority of drug stocks closely resemble the merchandise lines of non-related stores and "cut" prices emphasize that there is no difference in their kind and quality

The drug store's foundation, pharmacy, has always given the former a higher standing, but continued under-valuation of the foundation and a tendency to have drug stores resemble merchandise emporiums is molding public opinion accordingly The code relating to the retail drug industry has brought druggists, proprietors and clerks, face to face with the possibilities of lessened prestige The public has had a large part in the development of the complex drug store The following lines by a layman are quoted "I like drug stores It's reassuring to know that if you run out of anything, from aspirin to birthday greetings you need only to make a short promenade to the neighborhood pharmaceutical establishment" "So let there be drug stores They're not only soothing, they're even necessary"

THE VALUE OF RESPONSIBILITY

The matter of adequate charge for time is sometimes overlooked in prescription practice, and insufficient thought is frequently given to the responsibilities pharmacists assume in connection with their activities In these NRA days, perhaps more than ever before, the pharmacist must concern himself with actual net profit Liberty is taken in quoting from an article by J C Peacock, presented before the Section on Commercial Interests, A PH A , in 1917, which is applicable

"The responsibility of the pharmacist is of peculiar form, if for no other reason than that it is a by-product of his work, consequently, the more work, the more responsibility Responsibility is a condition of several phases, one phase of it is its part of or its presence in the mentality of the compounding, thus it is proportionately entitled to recognition, if the manipulation itself is worthy of notice, it is, therefore, not only service, but profound service, as service, it should be figured as expense, and as expense, it should be considered in the fixed charges and provided for accordingly" The author submitted the following

"That the responsibility of the pharmacist is part of the service which he renders in truth, the most profound part

"That responsibility seems to have been generally neglected as a source of revenue

"That it is thereby shown to have been underestimated by many

'That its possibilities should be understood and accordingly appreciated by all pharmacists, that it may rise in their own esteem to that plane where it belongs

That it should be capitalized at a value which prohibits it from being given away while the twine around the bundle is charged to the expense account

' That each pharmacist must do this for himself

'That now is the golden opportunity to correct this waste

"That suggestions and experiences be given toward the solution of this problem for the common good "

THE TREND OF PRESCRIBING IN GREAT BRITAIN

THE *Pharmaceutical Journal* (England) comments editorially on the trend of prescribing in Great Britain and makes references to the surveys made in the United States A few points of interest for American pharmacists can be gleaned from the editorial which summarizes three reports, one is a study of 40,000 prescriptions, the ingredients of which are to a limited extent restricted by regulations which obtain in dispensing under the National Health Insurance Acts, one is an analysis made in 1894 by W Martindale of 12,000 prescriptions, another, by B Cockburn, in 1913, of 1000 London prescriptions

Several deductions are of general interest, considering the first ten drugs and preparations of the three lists, it is found by the editor that the prescribing of quinine sulphate, potassium bicarbonate and aromatic spirit of ammonia has declined, sodium bicarbonate, tincture of nux vomica and ammonium carbonate have retained their places during the last forty years Potassium bromide shows a decline and the editor comments by questioning "Does this mean that bromides are being replaced by other sedatives, or is it an indication that in spite of psychopathists' warnings mankind is less in need of sedatives to-day than in quieter times of last century?" Another comment is of interest, namely, "that acetanilid, on which numerous adverse comments have been made, is prescribed with greater frequency than the newer analgesic"—(the reference applies to aspirin)

STATE LEGISLATION SUPPORTING NRA CODES

REFERENCE was made in the February JOURNAL to a "model" State industrial recovery act which has been submitted to governors Acting on the suggestion of Administrator Hugh S Johnson, State aid to the Federal Government in giving legislative force to NRA agreements as they apply particularly to intrastate industry and business is represented in measures by the legislatures of West Virginia and New Jersey The West Virginia act signed by Governor Krump places the police power behind code enforcement, the form follows the plan of Administrator Johnson

Two measures are under way in the New Jersey legislative bodies Assessment of industry to meet the cost of State Code enforcement with power in the State code authority to sue delinquents is the original purpose of the first measure, the second bill provides for a State appropriation to maintain the State recovery administration State authorities are denied the power to modify NRA codes, under a provision of the first bill Another provision requires the State recovery administration to permit an industry to convert from a state code to an NRA code, where a majority of the industry—majority as to number and as to volume of business—shall so elect

SCIENTIFIC SECTION

ABSORPTION OF VITAMIN D FROM THE SKIN *

BY FLORIN J AMRHEIN

HISTORICAL INTRODUCTION

For many years the workers in the field of nutrition have recognized the fact that certain food factors were responsible for many changes that occur in the human body Many experiments were conducted with various food materials It was found that pure carbohydrates, pure proteins, pure fats and pure mineral salts were not sufficient to maintain proper body needs and that the presence of other substances in food was apparently necessary

To Mellanby (1) belongs the credit of the discovery of the specific antirachitic factor, now known as vitamin D Mellanby, in his reports of 1918 and 1919, gave to the world the first accounts of experimental rickets developed in animals He used the dog and he showed that rickets could be cured by dietary means

Hess and Unger (2) in 1919–1920, believed that in the presence of another vitamin (now known as vitamin A), that rickets sometimes developed in infants receiving large amounts of milk which they believed contained large amounts of these fat-soluble vitamins

Sherman and Pappenheimer (3) in 1921 in their experiments showed that rickets may be caused by a disturbance in the mineral constituents of the foods eaten In their diets they used vitamin-deficient foods of all types Their experiments were not as conclusive as they might have been due to the fact that the animals used had not been completely depleted of their vitamin reserve It has been shown experimentally that the body is capable of storing vitamins for future use

About this time we find that Shipley, Park, McCollum and Simmonds (4) reported that the phosphate ions may have something to do with the apparent deficiency of calcium in the bones of the animals In 1921–1922 these same investigators made a comparison of the relative protective value of butter fat and cod liver oil when given to albino rats on a low calcium diet They reported that cod liver oil contains an abundance of some substance which directs the bone development and that it enables the animals to develop bones on a low calcium diet, but that butter contains only slight amounts of the substance

From this time up to the present we find that the literature on vitamin D has grown so that it is possible to find as many as one thousand references on the subject in all of its various phases Among some of the workers in the field we find the following Windhaus, Steenbock, Hess, Hoppert, Humphrey, Bogert, Trail, Nelson, Huldschinsky, Hyole, Poulsson, Bills, Holmes and Bliss

It is a generally accepted fact that this fat-soluble vitamin, vitamin D, is necessary in the diet in order to insure proper calcium metabolism If absent in the diet of infants and very young children it causes malformation of the skeletal structure

* Scientific Section, A PH A , Madison meeting, 1933

of the body and the disease is known as rickets In the adult its absence is said to cause the condition known as osteomalacia

During all of this experimental work it was found that sunshine was a good source of vitamin D, although certain conditions were necessary in order to get optimum results Wyman (5) in 1927, working at the Children's Hospital in Boston, found that much of the ultraviolet light, which is the source or activator of the vitamin, would be lost unless certain filters were used, and he also noted that certain types of glass completely absorbed the ultraviolet light and prevented its passage into the room

Steenbock (6) reported that the vitamin could be produced in foods that were exposed to the light from a mercury arc This process is now known as the process of activation of foods The process is protected by United States patents, and persons using the process are licensed by the Alumni Association of the University of Wisconsin who own the patent

Since the sun is nature's source of vitamin D it can be stated that before man covered his body completely with clothing he no doubt obtained much of the vitamin from the sun However, with the over-population of the large centers and with the advent of the custom of completely covering the body with clothing much of the beneficial effects of the sun rays were lost and more and more the human race became dependent upon the food supply for this vitamin

We may well ask what has all this to do with the calcium distribution in the human body? If we consider the structure of the skin we will find that in the subepidermal layer of the skin there are layers of fat cells which contain cholesterol This cholesterol becomes activated by the ultraviolet rays of the sun and in this way the body is furnished with the vitamin which in turn is absorbed by the skin capillaries and carried into the blood stream This complex reaction then is thought to cause calcium deposition

As has been stated modern man living primarily in the canyons of the large cities is for the most part deprived of nature's way of getting vitamin D This causes the various conditions previously described and therefore the medical profession recognizing this fact has attempted to overcome these natural inequalities by adding to the diet substances rich in vitamin D, such as cod liver oil and other fish oils

OBJECT OF THE INVESTIGATION

The object of this investigation is to determine under what conditions can vitamin D be absorbed from the skin This work was suggested by the work done by Hume, Lucas and Smith (7) in 1927 These investigators irradiated cholesterol and applied an oil solution to the test animals after first removing the hair of the animals and covering the spot so that the animals could not lap off any of the material They found that some vitamin was absorbed from the skin The author experienced some difficulty in using their technic on white rats, so during the course of the work a new method was developed which will be described in another place

DEVELOPMENT OF EXPERIMENTAL RICKETS

In order to produce experimental rickets the diet must be deficient in vitamin D, and it must also be abnormal in both calcium and phosphorus It has been

found that when diets contain calcium and phosphorus in the ratio of 2 parts of calcium to 1 part of phosphorus that normal bone is formed, but when the ratio of calcium to phosphorus is very high, *i e*, 4 to 1 or higher, that they produce a type of rickets similar to that found in infants Low calcium-high phosphorous diets will also produce rickets, but of a different type

The standard ricket-producing diet of Steenbock, No 2965, was used in the experiments Its composition is as follows

Diet No 2965

Yellow corn	76%
Wheat gluten	20%
Calcium carbonate	3%
Sodium chloride	1%

Calcium phosphorus ratio Ca P = 4 1

This diet is decidedly lacking in vitamin D and it has a high calcium to phosphorous ration, although by no means ideal in other respects it is sufficiently adequate to support growth and maintain satisfactory state of nutrition during the experimental period The rats are placed on this diet from twenty-one to twenty-eight days or until they show definite symptoms of rickets as indicated by their gait, etc

The animals are then lightly etherized and roentgengrams of the knee joints are taken Care must be exercised not to give the animals an overdose of ether as it will kill them This method of determining whether or not active rickets has developed in the animal checks each animal, thus assuring the rachitic condition of each animal, also the animal may be used for the repair diet The latter and the former are advantages of this method over the line-test method During the entire experimental period the animals are kept in darkened rooms, away from both daylight and sunlight

THE REPAIR DIET

Ordinarily the vitamin D containing material is either fed directly to the animals or it is mixed with the diet that is fed the animals For the purpose of this work it is obvious that the material cannot be fed to the animals but must be applied to the skin and then absorbed through the skin if possible

Among the materials used in this investigation are included the following peanut oil, unirradiated cod liver oil concentrate in peanut oil containing 6000 A D M A units per Gm, cod liver oil, U S P, irradiated cholesterol in creams The cream base consisted of vitamin D free substances as mineral oil, waxes and water One cream contained 1000 A D M A units and the other 3000 A D M A units per 120 Gm, respectively

AUTHOR'S RAT-TAIL METHOD

Pieces of pyrex tubing of the proper diameter (this depends upon the size of the rat's tail) were cut in lengths so that when the rat's tail is inserted into the tube about seven-eighths of it is encased by the tube The tube is sealed at one end and the other end is fire polished so that it will not cut the animal The animal is

then weighed without the tube The material is then spread on the rat's tail and the tail is then slipped into the tube The tube is fastened to the animal by means of adhesive tape The material is allowed to remain on the tail for twenty-four hours Each day the animal is weighed and its weight noted, the tube being removed first and also any adhering material during the 10-day test period The results obtained are of value only if the animal has consistently gained in weight during the repair diet period All food fed the animals is weighed each day and the amount left by each animal is also noted

Experiments were carried out on peanut oil in order to make sure that the peanut oil did not contain any vitamin D

TABLE I —RESULTS OF EXPERIMENT USING PEANUT OIL

Series I Rat No	Weight of Rat Beginning Test	Weight of Rat End of Test.	Gain in Weight
462	50 7 Gm	58 6 Gm	7 9 Gm
464	66 8 Gm	72 4 Gm	5 6 Gm
465	58 5 Gm	68 3 Gm	9 8 Gm
467	65 1 Gm	74 0 Gm	8 9 Gm

From the above table it will be seen that these rats continued to gain in weight when peanut oil was added to their diet, although examination of the roentgengram photographs attached at the end of the tables shows that active rickets are still in progress and that the oil does not contain vitamin D

RESULTS OF EXPERIMENT USING COD LIVER OIL CONCENTRATE DISSOLVED IN PEANUT OIL CONTAINING 6000 A D M A UNITS PER GRAM

This material represents the unsaponifiable material from cod liver oil Cod liver oil when treated with potassium hydroxide forms a soft soap This soap when extracted with ether yields in the ether extract a fatty wax-like solid which is not soluble in water, but is soluble in alcohol, fats, oils and waxes It is sterol in character and conforms to all of the requirements for a lipoid It has a distinct fishy odor The odor is fairly well disguised when dissolved in a bland oil-like peanut oil, although corn oil tends to accentuate the odor of the concentrate

TABLE II —COD LIVER OIL CONCENTRATE IN PEANUT OIL

Series II Rat No	Weight of Rat Beginning of Test	Weight of Rat End of Test	Gain in Weight
455	62 7 Gm	66 6 Gm	3 6 Gm
457	58 1 Gm	63 7 Gm	5 6 Gm
458	74 9 Gm	81 5 Gm	6 6 Gm
459	55 9 Gm	59 6 Gm	3 7 Gm
460	62 7 Gm	70 1 Gm	7 4 Gm
461	57 3 Gm	58 8 Gm	1 5 Gm

In this series excellent repair was noted as indicated by the photographs of the roentgengrams The experiments show definitely that vitamin D can be absorbed from oil solution

A comparison of the photographs of the roentgengrams taken of the hind legs of the animals used in Table III shows conclusively that cod liver oil, *i e*, the vitamin D from cod liver oil is absorbed from the skin

TABLE III —RESULTS OF EXPERIMENT USING COD LIVER OIL

Series III Rat No	Weight of Rat Beginning of Test	Weight of Rat End of Test	Gain in Weight
479	60 6 Gm	69 9 Gm	9 3 Gm
480	50 3 Gm	52 4 Gm	2 4 Gm
481	61 9 Gm	66 8 Gm	4 9 Gm
482	62 4 Gm	66 1 Gm	3 7 Gm
483	49 2 Gm	53 5 Gm	4 3 Gm

The experiments to this point indicate that vitamin D can be absorbed from the skin All of these tests, however, were performed on material of vegetable and animal origin The author was interested in the effect of mineral oil on the absorption properties of the skin, and so several experiments were conducted on creams prepared from mineral oil, wax, water and borax The results are indicated in the roentgengram photographs included in the report

The technic followed is the same as that already described

TABLE IV —RESULTS OF EXPERIMENT USING MINERAL OIL BASE CREAM CREAM CONTAINED 1000 A D M A UNITS PER 120 GM

Series IV Rat No	Weight of Rat Beginning of Test	Weight of Rat End of Test	Gain in Weight
472	62 8 Gm	72 2 Gm	9 4 Gm
473	61 3 Gm	64 9 Gm	3 6 Gm

TABLE V —RESULTS OF EXPERIMENT USING MINERAL OIL BASE CREAM CREAM CONTAINED 3000 A D M A UNITS PER 120 GM

Series V Rat No	Weight of Rat Beginning of Test	Weight of Rat I nd of Test	Gain in Weight
474	62 4 Gm	72 0 Gm	9 6 Gm
475	58 1 Gm	65 1 Gm	7 0 Gm

The experiments made on the absorption of vitamin D from the skin by Hume, Lucas and Smith (7) were performed on cholesterol that had been artificially irradiated For sometime the author has been interested in the problem of sun irradiation In his experiments he has found that several factors affect the success of the work However, experiments have shown that the sun may be used as a source of vitamin D when the proper technic and apparatus is used

The author has irradiated cholesterol and has incorporated this cholesterol in the cream base described above The roentgengram photographs show that vitamin D may be obtained by the sun irradiation of cholesterol provided the choles terol has not been highly purified It was found that cosmetic creams containing irradiated cholesterol caused repair to take place in rachitic rats

TABLE VI —RESULTS OF EXPERIMENT USING SUN IRRADIATED CHOLESTEROL IN COSMETIC CREAM

Series VI Rat No	Weight of Rat Beginning of Test	Weight of Rat End of Test	Gain in Weight
476	55 1 Gm	62 4 Gm	7 3 Gm
477	56 6 Gm	61 1 Gm	4 5 Gm
478	60 0 Gm	71 9 Gm	11 9 Gm

PHOTOGRAPHS OF ROENTGENGRAMS

This part of the paper deals with the photographs of the roentgengrams taken of the knee prints of the experimental animals The photographs that appear on

the left of the page under the title, "Beginning of the Test," indicate the stage of rickets developed in the animals due to being fed a diet deficient in vitamin D In each case it will be noted that marked rickets are present

The photographs that appear on the right of the page under the title, ' End of the Test Period," represent the condition of the bones after the animal had been on a diet containing antirachitic material With the exception of the experiments with peanut oil it will be noted that in each case the X-ray pictures show that distinct repair had been going on and in some instances complete healing had taken place

At the request of the publication committee the author has only submitted one roentgengram photograph of a rat in each series Other photographs will be sent to anyone interested in same

The author feels that it is entirely possible to use this method in quantitating the amount of vitamin D in material containing the vitamin and he is at present conducting said experiments

Photographs of roentgengrams indicating that peanut oil does not contain any antirachitic substances since no repair has taken place in the rachitic bones after the oil was added to the diet

Beginning of Test Series I, 465

End of Test Period Series I, 465

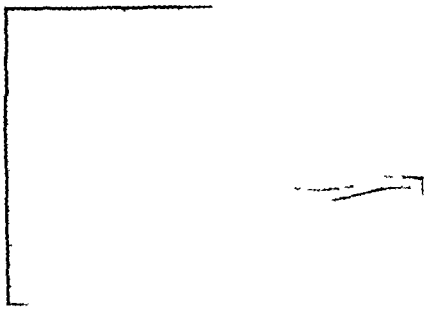
Photographs of roentgengrams obtained in the experiments using cod liver oil concentrate in peanut oil, 6000 A D M A units per Gm

Beginning of Test Series II 458

End of Test Period Series II, 458

Photographs of roentgengrams obtained in the experiments using cod liver oil U S P X

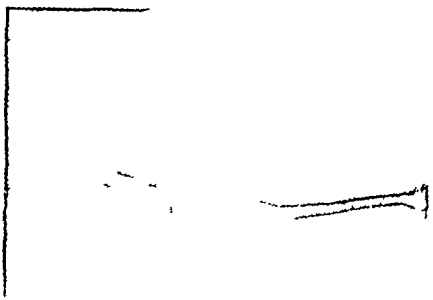
Beginning of Test Series III 481



End of Test Period Series III, 481

Photographs of roentgengrams obtained using a mineral oil base cream containing 1000 A D M A units per 120 Gm

Beginning of Test Series IV 472



End of Test Period Series IV, 472

Photographs of roentgengrams obtained using mineral oil base cream containing 3000 A D M A units per 120 Gm

Beginning of Test Series V, 474

End of Test Period Series V, 474

Photographs of roentgengrams obtained using sun irradiated cholesterol in mineral oil cream base

Beginning of Test Series VI 476

End of Test Period Series VI, 476

PHOTOMICROGRAPHS

In order to establish the extent of repair and also to approximate the extent of decalcification that had taken place in the experimental animal's bones the author felt that photomicrographs of the bone sections were necessary

One of the hind legs of each animal was used for the purpose After fixing in 10% formalin for 48 hours the legs were prepared for the "Celloidin Embedding' blocking process and sections of the bone were used to prepare microscopic mounts Before mounting the sections in the usual routine manner, they were stained using "hematoxylin and eosin" Each photomicrograph represents about a 400 × magnification of the section

Examination of the photomicrographs clearly shows the following (1) the extent of decalcification that occurred in the bone during the development of experimental rickets, (2) the amount of repair or healing that took place during the ten-day repair period

These photomicrographs also serve as a check on the roentgengram findings or interpretations At the request of the editor of the JOURNAL and also the Committee on Publications these photomicrographs were omitted However, anyone interested may receive them by writing to the author

CONCLUSIONS

1 The object of the thesis has been achieved, namely, that vitamin D can be absorbed from the skin Also, the vehicle apparently has little or no effect in the absorption test, since the vitamin was absorbed from both vegetable and mineral oil bases

2 In this investigation the author has developed a new method for the administration of vitamin D-containing substances, namely, the rat-tail method for the absorption of vitamin D

3 That cosmetic creams may be used as a vehicle for carrying the vitamin substance has been demonstrated in two instances

4 That the sun irradiation of cholesterol that has not been too highly purified is practical and that this material may be used as one of the sources of the vitamin

5 Experiments are now under way for the quantitative estimation of vitamin D using the rat-tail method This method may be of value in assay work

6 It has been found that the presence of a small amount of vitamin A tends to produce more satisfactory results

BIBLIOGRAPHY

(1) E Mellanby, 1919, An Experimental Investigation of Rickets," *Lancet*, 1 (1919) 407–412

(2) A F Hess and L J Unger, The Role of the Fat Soluble Vitamin in the Dietary of Infants " *Proc Soc Exptl Biol Med* , 17 (1920), 49–50

(3) H C Sherman and A M Pappenheimer, 'Experimental Rickets in Rats I A Diet Producing Rickets in White Rats, and Its Prevention by the Addition of Inorganic Salts," *Journal of Experimental Medicine*, 34 (1921), 189–198

(4) P G Shipley E A Park E V McCollum and N Simmonds, "Studies in Experimental Rickets III A Pathological Condition Bearing Fundamental Resemblance to Rickets of the Human Being Resulting from Diets Low in Phosphorus and Fat Soluble A The Phosphate Ion in Its Prevention " *Bull Johns Hopkins Hospital*, 32 (1931), 160–166

(5) E T Wyman 'The Prevention and Treatment of Rickets," *Boston Medical and Surgical Journal*, September 8, 1927

(6) H Steenbock and A Black Fat-Soluble Vitamins XVII The Induction of Growth Promoting and Calcifying Properties in Fats in a Ration by Exposure to Ultraviolet Light *J Biol Chem* , 61 (1924), 405–422

(7) E M Hume N S Lucas and H H Smith ' On Absorption of Vitamin D from the Skin, ' *J Biochem* 21 (1927) 362–367

(8) H C Sherman and S L Smith, 'The Vitamins," *American Chemical Society Monograph No 6* 2nd Edition 1931

(9) E V McCollum and N Simmonds, ' The Newer Knowledge of Nutrition " 4th Edition 1929, MacMillan and Company

(10) H C Sherman ' The Chemistry of Food and Nutrition," 3rd Edition, 1927, Mac Millan and Company

(11) M S Rose 'The Foundations of Nutrition " 1932 The MacMillan Company

(12) M Luckiesch, Artificial Sunlight Combining Radiation for Health with Light for Vision " D Van Nostrand Company, 1930

MASSACHUSETTS COLLEGE OF PHARMACY

FOOD AND DRUG LEGISLATION

No very definite progress has been made in legislation before Congress on the various Food and Drug bills The new Copeland bill, S 2800, was voted a favorable report by the Senate Committee on Commerce after amending it in many particulars The bill was reported to the Senate and has been printed in the Congressional Record for March 15th

The bill contains a new provision for the discretionary appointment of advisory committees representing the several trades and the public, but no provision has been made for an administrative board of review, as strongly requested by the activities affected

Other measures have not progressed and Senator Copeland is absent from Washington until about the end of March

ASSAY FOR VITAMIN B COMPLEX IN THE PRESENCE OF INTERFERING SUBSTANCES *

BY LLOYD K RIGGS, B J G CHIEGO, W L SAMPSON AND ANNABEL BEATY

In the usual method of assay for the vitamin B complex young rats are starved for this complex until a sharp decline of weight is observed The minimum dose of the material under investigation, necessary to restore a normal rate of growth, is then determined

In applying this method the following factors may well be taken into account (1) The accuracy of the method must obviously depend somewhat upon the nicety of judgment as to whether the normal rate of growth is restored or not (2) The interpretation of results is facilitated by the use of a physical standard of reference, a material of well-known vitamin B complex potency, to which all assays for this vitamin complex may be referred (3) The method is not quite generally applicable because of the fact that some food and medicinal products contain salts, drugs, laxatives, poisons or odd flavoring materials, which experimental animals either refuse to eat or from which complicated abnormal or ill effects follow In other specimens, the vitamin is in such dilution that a concentration must be made

1 TEST FOR THE RESTORATION OF NORMAL RATE OF GROWTH

It is frequently observed that litter mates of the same sex do not grow at the same rate even when kept under identical conditions of housing and diet When animals which have declined in weight due to starvation for the vitamin B complex are fed on several different doses of a given test material, animals on different doses may all gain in weight but it is frequently difficult to be certain that any one animal has been restored to its individual normal growth rate This element of uncertainty may be eliminated if at the end of the test period all test doses are discontinued and each animal is then given a daily dose of dried brewers' yeast which is known to be several times the minimum amount required for normal growth The growth curves of the animals are then followed for a week or two If the curve breaks upward with the feeding of the brewers' yeast, the previous dose of the test material was inadequate If the growth curve continues as when the previous dose was given, the previous dose was adequate for normal growth

2 PHYSICAL STANDARDS OF REFERENCE

In order to overcome the known variation in the response of animals to vitamin feeding this laboratory has adopted the procedure of making assays for the vitamin B complex comparative Various doses of a material to be tested for the vitamin B complex are fed in comparison with fresh bakers' yeast cake (Fleischmann) and dried brewers' yeast (Harris) Only a few animals need to be placed on doses of the yeast cake or of dried brewers' yeast, because it has been learned from several years of experience that 1500 mg of the fresh yeast cake is approximately equivalent to 100 mg of the dried brewers' yeast and that the vitamin B complex potency of these doses is just about adequate for normal growth of young rats It is also the experience of this laboratory that the dried brewers' yeast, when kept in closed con-

* Scientific Section, A PH A , Madison meeting, 1933

tainers, shows no detectable variations in potency over a period of about three years This material has, therefore, been adopted as a standard of reference for this laboratory The general adoption of some such standard would greatly facilitate interpretation of the results obtained by different laboratories

3 ASSAY OF A FOOD MATERIAL WHICH ANIMALS DO NOT EAT READILY

An attempt was made to assay the vitamin B complex in bouillon cubes[1] prepared from an extract of brewers' yeast and presumably containing vitamin B On account of the salts and flavoring of these cubes, experimental animals refused, after the first few days of the test, to eat the portions of bouillon cube supplied to them, either in the form of small (weighed) pieces of the cube or as similar amounts of the cube material mixed with some inert substance such as starch or dextrin For purposes of assay it was therefore necessary to devise some method for the extraction of the vitamin-bearing constituents of the bouillon cubes

The approximate composition of the bouillon cubes is indicated in the following table (Table I)

TABLE I

Moisture	5 84%
Nitrogen	3 54
Protein ($N \times 6\ 25$)	22 13
Ash	61 35
NaCl	55 02

I EXTRACTION EXPERIMENTS OF BOUILLON CUBES

A survey of the literature dealing with the properties of the vitamin B complex lead to a consideration of the three following possible methods for the extraction of the vitamin B bearing material from bouillon cubes

1 Extraction with dilute alcohol (approximately 70%)
2 Adsorption of the vitamin on fuller's earth
3 Extraction of the vitamin-bearing material with glacial acetic acid

Method No 1 was tried and discarded because it was found that a complete extraction by this method required repeated extractions and chilling of the extract in the refrigerator over night Such procedure results in so much exposure of the extract to the influence of atmospheric oxygen as to very largely destroy the vitamin B present in the original cube material

Method No 2 was tried and discarded because it was found that while it was very easy to adsorb a portion of the vitamin-bearing material on fuller's earth, there appeared to be no satisfactory way in which we might be assured that the vitamin-bearing material was quantitatively adsorbed The probability of a selective adsorption of the vitamin B factors was also taken into consideration

Method No 3—extraction with acetic acid—was finally adopted for use in this series of studies The method, as first tried, gave rather irregular results because of apparent differences in the amount of exposure to the air which occurred in the preparation of different batches of the extract A standardized procedure finally

[1] Yeast Bouillon Cubes—Harris, prepared by the Harris Laboratories, Tuckahoe, New York

was selected, after repeated trials, which yields rather uniform results This method of extraction is briefly described below

Ten bouillon cubes, weighing on the average 45 Gm , are crushed in a small mortar and washed into a small beaker with 135 cc of glacial acetic acid The cubes and acid are heated as rapidly as possible, with constant stirring, to boiling As soon as the mixture is boiling vigorously, the beaker is removed from the burner and the acetic acid-insoluble material is allowed to settle for a few moments The clear, supernatant liquor is then decanted through a funnel in which a filter mass of absorbent cotton has been previously moistened with glacial acetic acid

As soon as a small amount of the filtrate (acetic acid extract) is obtained, it is drawn, little by little, by vacuum, into a 150-cc weighed distillation flask The acetic acid extract is drawn into the distilling flask through a glass tube drawn out to a capillary so that the acetic acid solution falls into the flask a few drops at a time and evaporates almost as rapidly as it is delivered to the flask The flask is immersed in a water-bath kept at a temperature of 70° C The flask is connected by means of a Liebig condenser with a vacuum pump so that the acetic acid is distilled off under a high vacuum

The residue remaining in the beaker after the first extraction is again extracted with 100 cc glacial acetic acid and the acetic acid solution is decanted through the same filter into the same receiving flask The residue from this extraction is again similarly extracted twice with 50-cc portions of glacial acetic acid and then once extracted with 25 cc of glacial acetic acid The final portion of acetic acid (25 cc) is practically colorless and serves the purpose of removing all but the last traces of the acetic acid-soluble material which remains on the cotton filter through which each extract is poured

The vacuum distillation is continued during the time that the several extractions are being made, so that at the time the final extraction is completed, only a small amount of the acetic acid solution remains to be distilled As soon as all of the acetic acid solution has been transferred to the distilling flask, the inlet tube is connected to a reservoir of nitrogen gas and the distillation is continued under a stream of nitrogen until the final volume of the material in the flask has been reduced to approximately 60 cc

At this point in the procedure the flask is removed from the hot water-bath and the flask is cooled with either tap water or ice water The flow of nitrogen gas is continued during the cooling of the flask When the flask is cool, starch is added to the semi-solid residue and the flask is placed in a vacuum desiccator over sodium hydroxide sticks The desiccator is evacuated under the highest possible vacuum and the mixture of starch and extract of the cubes is allowed to remain in the flask in the desiccator for two days At the end of two days' time the vacuum is released with dry nitrogen gas and the flask with its contents is removed and accurately weighed The weight of the flask alone was taken before the experiment was begun Additional starch is now added in an amount which will bring the contents of the flask to three times the weight of the ten cubes taken for the extraction

It is obvious that three Gm of the mixture of starch and cube extract now contains approximately the same amount of acetic acid-soluble material as was contained in one Gm of the original cube This is the material that is fed to the experimental animals in testing the vitamin B (complex) potency of the bouillon

cubes If, then, we assume that all of the vitamin B complex is soluble in acetic acid and if we further assume that no losses have occurred during the laboratory manipulations to which the material has been subjected, we may then assume that the vitamin B complex potency of the starch mixture represents the vitamin B complex potency of the original bouillon cube in the proportion of three to one There is apparently no simple way in which the validity of the two essential assumptions upon which the third assumption is based, may be definitely verified It is almost certain that the second assumption is not entirely correct, because we find that if any delay in the extraction and distillation procedure occurs, a less potent vitamin extract is obtained A more correct statement of this assumption might then well be that, by standardizing as nearly as possible our procedure and making our extractions as rapidly as possible and with as little exposure to air as possible, we are able to make the extraction with a minimum loss of vitamin B complex potency

TABLE II —GROWTH OF ANIMALS ON TEST DOSES—EFFECT OF SURPLUS OF BREWERS' YEAST

Animal	Material Fed	Daily Dose in Mg	Days on Given Dose	Total Weight Change	Daily Weight Change	Dose of B Y in Mg	Days on B Y	Total Weight Change	Daily Weight Change
7 F	B Y	25	54	27	0 5	1000	26	37	1 423
8 M	B Y	50	54	56	1 037	1000	26	54	2 076
2 F	B Y	50	53	44	0 8301	1000	26	35	1 346
1 M	B Y	100	53	90	1 698	1000	26	36	1 384
19 M	B Y	100	53	95	1 792	1000	26	41	1 576
4 F	B Y	150	55	62	1 127	1000	13	11	0 8461
23 M	B Y	150	52	81	1 553	1000	27	48	1 777
6 M	B Y	200	50	90	1 800	1000	12	11	0 9166
17 M	B Y	200	50	90	1 800	1000	12	22	1 833
27 M	Y B C	100	54	11	0 2037	1000	26	87	3 346
10 F	Y B C	100	54	− 3	−0 055	1000	26	56	2 153
12 F	Y B C	100	54	11	0 2037	1000	26	53	1 203
15 F	Y B C	200	54	33	0 6111	1000	26	56	2 153
13 M	Y B C	200	54	31	0 5740	1000	26	77	2 961
29 M	Y B C	300	56	60	1 071	1000	26	50	1 923
22 F	Y B C	300	54	68	1 259	1000	26	21	0 8076
28 F	Y B C	400	56	56	1 000	1000	26	23	0 8846
3 F	Y B C	400	56	55	0 9821	1000	26	19	0 7307
20 F	F Y C	500	54	23	0 4259	1000	27	45	1 666
9 M	F Y C	500	34	12	0 3527	Died at end of 34 days			
30 M	F Y C	1000	54	55	1 018	1000	27	74	2 740
11 M	F Y C	1000	54	28	0 5185	1000	27	28	1 036
21 M	F Y C	1000	54	58	1 036	1000	27	60	2 222
24 M	F Y C	1500	54	61	1 129	1000	27	31	1 148
26 F	F Y C	2000	50	43	0 8600	1000	26	14	0 5384
25 F	F Y C	2000	54	56	1 036	1000	27	24	0 8888

NOTE B Y = Brewers' Yeast, Y B C = Yeast Bouillon Cube, F Y C = Fleischmann's Yeast Cake

From the above it appears to us that the minimum vitamin B complex dose for normal growth of the young white rat is as follows

Brewers' yeast	100 mg
Bouillon cubes	300 mg
Yeast cake	1500 mg

II ANIMAL EXPERIMENTS

Some seventy-five animals were used in establishing the relative vitamin B complex potency of dried brewers' yeast (Harris), fresh yeast cake (Fleischmann) and yeast bouillon cube (Harris) It is not necessary to present the complete data obtained from all of these animals because the complete data are in strict conformity with the data of one typical test, using twenty-six animals, and employing the technic described above The data of this test are presented in Table II

It will be noted from the data of Table II that those animals that received daily doses of less than 100 mg of brewers' yeast, less than 300 mg of yeast bouillon cube and less than 1500 mg of fresh yeast cake, when changed from the test doses to 1000 mg of brewers' yeast showed a daily gain of weight greater than the daily gain of weight on the test doses Those animals receiving daily doses of at least 100 mg of brewers' yeast, 300 mg of yeast bouillon cube and 1500 mg of yeast cake do not show a marked increased rate of gain when transferred to 1000 mg of brewers' yeast

From these observations it is possible to draw the conclusions that 100 mg of the dry brewers' yeast, 300 mg of the material of the yeast bouillon cubes, and 1500 mg of the fresh yeast cakes are each adequate for the normal growth of rats for the period of this test

The vitamin B complex potency of yeast cakes and the yeast bouillon cubes used in these studies may be expressed in terms of the potency of the physical standard[1] employed in this laboratory as follows

$$\frac{\text{Minimum adequate dose of the standard}}{\text{Minimum adequate dose of bouillon cube}} = \frac{100}{300} = \frac{1}{3}$$

The bouillon cube then has a vitamin B complex potency of 33% that of the standard

$$\frac{\text{Minimum adequate dose of the standard}}{\text{Minimum adequate dose of yeast cake}} = \frac{100}{1500} = \frac{1}{15}$$

The yeast cake then has a vitamin B complex potency of 6 6% that of the standard

If one wishes to reduce the figures obtained to the basis of the dry materials contained in each product, it is only necessary to take into account the fact that the brewers' yeast contains approximately 1% moisture and that the bouillon cubes and the yeast cakes contain approximately 5 8% and 66% moisture, respectively Thus 99 mg , 286 mg and 495 mg of the dry material of brewers' yeast, of bouillon cube and of yeast cake, respectively, may each be said to contain one adequate dose of the vitamin B complex which might well be called one unit of the vitamin B complex

It might be well to point out that one bouillon cube weighs approximately 4 5 Gm (4500 mg) and that one yeast cake weighs approximately 12 5 Gm (12,500 mg) One bouillon cube will then contain

$$\frac{4500}{300} = 15 \text{ units of the vitamin B complex}$$

[1]Dried brewers' yeast—Harris

One yeast cake will then contain

$$\frac{12\,500}{1500} = 8\,33 \text{ units of the vitamin B complex}$$

We have found that a simple and convenient method for the graphic representation of the growth of animals which have been used in a test employing the technic described above is to lay off on cross section paper a line representing the weight during the test period, *i e*, a line joining the graphic points representing the weights at the beginning and the end of the test period A second line representing the weight of the animal during the period in which the excessive dose of brewers' yeast is fed is similarly laid off on the same paper The angle at which

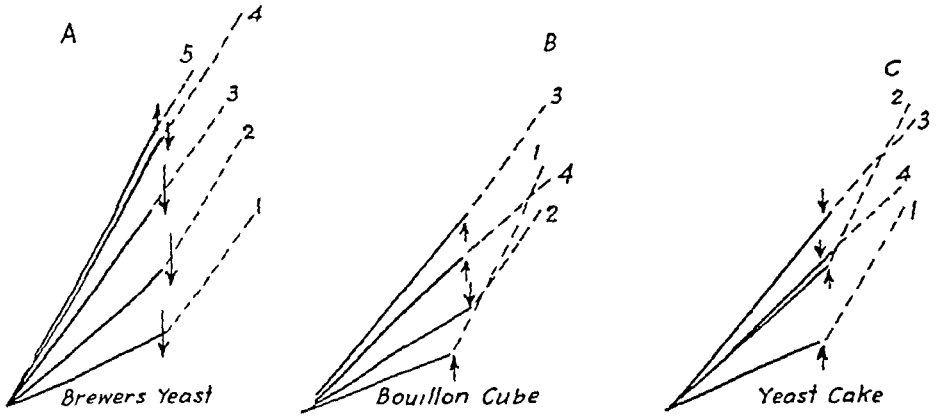


Fig 1

Curves No 1, 2 3, 4 and 5, division A, of Fig 1 are constructed from the composite weight figures of animals fed on 25 50, 100 150 and 200 mg of brewers yeast, respectively Arrows indicate the feeding of 1000 mg of brewers' yeast Curves 1, 2, 3 and 4, division B, represent animals on 100, 200, 300 and 400 mg of bouillion cube Curves 1 2, 3 and 4, division C, represent animals fed on 500, 1000, 1500 and 2000 mg of fresh yeast cake The upward breaks in curves 1 and 2 of each series indicate

25 mg brewers' yeast is inadequate for normal growth
50 mg brewers' yeast is inadequate for normal growth
100 mg bouillon cubes is inadequate for normal growth
200 mg bouillon cubes is inadequate for normal growth
500 mg yeast cake is inadequate for normal growth
1000 mg yeast cake is inadequate for normal growth

these lines intersect indicates any change in the rate of growth during the two periods In cases in which several animals are on each dose, the composite weight figures for the several animals may conveniently be used in the construction of such figures

The composite weight figures for the animals employed in this test were used for the construction of Fig 1

SUMMARY

1 A simple method is described for the extraction of the vitamin B complex bearing material from such food products as bouillon cubes prepared from an extract of yeast This extraction is by means of glacial acetic acid The acetic acid is removed by distillation in vacuum and in a stream of inert gas such as nitrogen

The paste remaining in the distillation flask is mixed with starch and aliquot parts of the starch mixture are fed as known doses of the material of the bouillon cube

It is obvious that this method will be inapplicable for the separation of the vitamin B complex from interfering substances which are soluble in glacial acetic acid

2 A simple method is described which employs each test animal used in an assay for the vitamin B complex as its own control Experimental animals, depleted of the vitamin B complex, are fed on given doses of the material to be tested At the end of the test period a daily dose of a material (dried brewers' yeast) known to contain several times the minimum adequate dose of the vitamin B complex required for normal growth is substituted for the daily dose of the test material under investigation If the growth curve breaks upward with the feeding of the large dose of brewers' yeast, the given dose of the test material was inadequate for normal growth

3 Dried brewers' yeast known to be stable for a period of at least three years is suggested as a physical standard of reference of assays for the vitamin B complex

4 It has been found that 100 mg of brewers' yeast, 300 mg of bouillon cube and 1500 mg of yeast cake are equivalent in vitamin B complex potency

LABORATORIES OF THE RUTGERS UNIVERSITY,
COLLEGE OF PHARMACY

THE COLORIMETRIC AND ELECTROMETRIC p_H DETERMINATIONS OF SOLUTIONS OF CERTAIN ALKALOIDAL SALTS *[1]

BY ALLEN F PETERS, B SC , AND ARTHUR OSOL, PH D

A review of the literature reveals several reports of investigations on the determination of the hydrogen-ion concentration of solutions of alkaloidal salts Evers (1) determined the colorimetric p_H values of solutions of the pure hydrochlorides of morphine, quinine and atropine and suggested the use of certain indicators which would give more accurate results in the titration of the corresponding free alkaloids McGill (2), and later Wagener and McGill (3), using electrometric methods of measurement, obtained values for pure quinine, morphine, strychnine and atropine salts Krantz (4), using a hydrogen electrode, determined the p_H values of pure quinine hydrochloride and also obtained data on the p_H values of quinine, strychnine and atropine dissolved in varying quantities of tenth-normal hydrochloric acid in excess

Masucci and Moffat (5) reported electrometric values for many commercial samples of morphine, codeine, quinine, strychnine, atropine and caffeine salts Wales (6) determined titration curves for various alkaloids and from these he obtained p_H values for pure salts Based on the latter, he recommended the use of certain indicators to minimize titration errors Finding great variations in commercial samples of alkaloidal salts, Eder (7) recommended the adoption of definite p_H limits for alkaloidal salt solutions More recently, Mellon and Tigelaar (8)

* Abstracted from the thesis of Allen F Peters, submitted to the Faculty of the Philadelphia College of Pharmacy and Science in partial fulfilment of the requirements for the degree of Master of Science in Chemistry [1] Scientific Section A PH A Madison meeting, 1933

compared the results of alkaloidal titrations using various indicators and constructed titration curves for atropine, strychnine and brucine

As many of the measurements reported in previous investigations were obtained from titration curves the authors of this paper considered it advisable to prepare certain pure salts from the corresponding pure alkaloids and to determine electrometric and colorimetric values of solutions of the salts The effect of dilution was likewise considered to be worth while investigating The results obtained in a study of this kind would be of value in setting p_H standards for testing for the presence of excess acidity or alkalinity in alkaloidal salts

EXPERIMENTAL

Pure brucine sulphate, strychnine hydrochloride, strychnine sulphate, quinidine sulphate and quinine sulphate were prepared by shaking a nearly saturated chloroform solution of the pure alkaloid with a quantity of the proper acid equivalent to approximately 75% of the alkaloid used The concentration of acid was sufficiently high to produce precipitation of the alkaloidal salt in the aqueous solution After filtration on a Buchner funnel, the salt was successively washed with chloroform, alcohol and water The residue was recrystallized from hot water, filtered, washed with water and dried between filter papers

Quinine bisulphate, quinine hydrochloride, quinine and urea hydrochloride and quinine hydrobromide were purified by repeated crystallization of commercial samples

The indicators listed in the tables were those which could be most easily matched with the standards Although slight precipitation was observed with certain solutions in the higher concentration range, the matching of colors was easily made

The results given for the electrometric determinations were calculated from electromotive force measurements of quinhydrone and tenth-normal calomel electrode combinations In the case of the higher concentrations of alkaloidal salt, the electromotive force measurements did not attain equilibrium, hence no p_H values are given in the tables While the cause of the instability of the potential is not known, it is, perhaps, connected with the precipitation which occurs in all solutions upon the addition of quinhydrone In the most dilute solutions the precipitation can be seen only with difficulty and the electromotive force remains constant within one or two millivolts, but with increasing salt concentration the precipitation becomes very noticeable and the potential too unsteady to measure Measurements made with hydrogen electrodes were, in general, also unsatisfactory

TABLE I —p_H OF QUINIDINE SULPHATE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample
0 25	6 4	6 33	6 2
0 50	6 4	6 35	6 3
1 00	6 5	6 39	6 4

These values for quinidine sulphate are in good agreement with a value of 6 1 obtained by Wales (6) from titration curves for this salt

In Table I and the following tables are set forth the results of the p_H determinations of pure salts as well as commercial samples The water used in preparing the solutions was freshly distilled and was found to have a p_H of 6 2 when tested with isohydric chlorphenol red Solutions made with distilled water of $p_H = 5\ 7$ as well as solutions through which carbon dioxide-free nitrogen was bubbled rarely differed by as much as 0 1 p_H unit from the values given in the tables

TABLE II —p_H OF QUININE SULPHATE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample
0 025	6 2	6 26	5 7
0 050	6 2	6 22	5 6
0 100	6 2	6 21	5 6

The values given in Table II are practically identical with the results obtained by Wales for quinine salts of strong acids, namely, 6 12

TABLE III —p_H OF QUININE HYDROBROMIDE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample.
0 10	6 2	6 34	5 8
0 25	6 2	6 29	5 9
0 50	6 2	6 26	6 0
1 00	6 3	6 24	6 2
2 00	6 4	6 21	6 2

Here again the values are comparable with that given by Wales for quinine salts It should be pointed out that the colorimetric values increase while the electrometric values decrease slightly with increasing salt concentration The discrepancy, which is rather small, probably originates in the neglect of salt effects in both the electrometric and colorimetric methods as well as the precipitation which occurs when quinhydrone is used

TABLE IV —p_H OF QUININE HYDROCHLORIDE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample
0 10	6 1	6 33	6 3
0 25	6 2	6 30	6 3
0 50	6 2	6 21	6 4
1 00	6 2	6 17	6 5
2 00	6 3	6 10	6 5
3 00	6 4		6 5
5 00	6 4		6 5

The corresponding values obtained by Krantz were 6 19 and 6 15 for 0 1% and 0 8% solutions respectively, while McGill reported values of approximately 6 0

TABLE V —p_H OF QUININE BISULPHATE SOLUTIONS

Per Cent Salt	Colorimetric p_H (LaMotte Yellow)	Electrometric p_H	Commercial Sample
0 10	3 6	3 54	3 6
0 25	3 6	3 38	3 6
0 50	3 6	3 30	3 6
1 00	3 6		3 5
2 00	3 5		3 5
5 00	3 5		3 4

No values for quinine bisulphate are available for comparison but Evers reports a value of 3 40 for quinine dihydrochloride

TABLE VI —p_H OF QUININE AND UREA HYDROCHLORIDE SOLUTIONS

Per Cent Salt	Colorimetric p_H (LaMotte Yellow)	Electrometric p_H	Commercial Sample
0 10	3 6	3 62	3 6
0 25	3 6	3 51	3 6
0 50	3 5	3 40	3 6
1 00	3 5	3 30	3 6
2 00	3 5		3 6
5 00	3 5		3 6

TABLE VII —p_H OF BRUCINE SULPHATE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample
0 10	5 6	5 74	7 5
0 25	5 5	5 70	7 6
0 50	5 4	5 63	7 7
1 00	5 3	5 52	

For brucine salts Wales reports a value of 4 85

TABLE VIII —p_H OF STRYCHNINE HYDROCHLORIDE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red) (Methyl Red)	Electrometric p_H	Commercial Sample.
0 50	5 6	5 62	6 1
1 00	5 5	5 42	6 2
1 50	5 4	5 35	6 2
2 00	5 3	5 16	6 3
2 50	5 3	5 12	6 3

Again Wales' value for strychnine 4 81, is lower than the values given in this table However McGill (2) reports values of 5 45 and 5 42 for 0 002 and 0 02 normal strychnine solutions respectively

TABLE IX —p_H OF STRYCHNINE SULPHATE SOLUTIONS

Per Cent Salt	Colorimetric p_H (Chlorphenol Red)	Electrometric p_H	Commercial Sample
0 50	5 8	5 83	5 2
1 00	5 8	5 74	5 1
1 50	5 7	5 68	5 0
2 00	5 6	5 61	5 0

From an inspection of Table IX it is evident that a slight difference exists between the values for strychnine hydrochloride and strychnine sulphate Whether or not the difference is real cannot be answered definitely

CONCLUSIONS

We have determined the electrometric and colorimetric p_H values of several pure alkaloidal salts Because of the precipitation which occurs when quinhydrone is added to the solutions, it is recommended that the colorimetric method should be used for routine work in testing for acidity or alkalinity of the salts reported in this paper

It has been found that, in general, the p_H values for a given salt solution are practically constant over a wide range of concentration

For a given alkaloidal base, it has been found that variation of the anion produces little if any change in the p_H values of solutions of the salt, provided the anion is of the strong acid type

It has been shown that the p_H values obtained from measurements of pure salt solutions are, in general, in good agreement with values obtained from titration curves

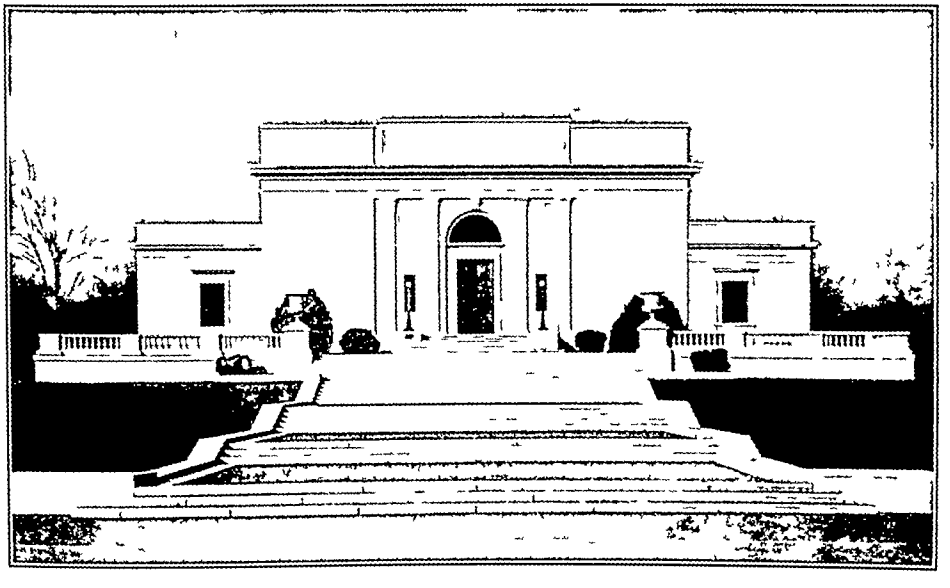
BIBLIOGRAPHY

(1) Evers *Pharm J*, 106 (1921), 470
(2) McGill *J Amer Chem Soc* 44 (1922), 2158
(3) Wagener and McGill JOUR A PH A, 14 (1925) 288
(4) Krantz, *Ibid* 14 (1925), 294
(5) Masucci and Moffat, *Ibid*, 12 (1923), 609
(6) Wales, *Ind Eng Chem*, 18 (1926) 390
(7) Eder *Pharm J*, 125 (1930), 242
(8) Mellon and Tigelaar, JOUR A PH A, 21 (1932), 672

LABORATORY OF PHYSICAL CHEMISTRY,
PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE,
PHILADELPHIA PA

NOTICE RESEARCH WORKERS IN PHARMACY

The returns for the 1934 census of Research in Pharmacy intended for publication are now being taken If any research worker has not received a blank, or if returns have not been made by workers to whom blanks have been sent it is requested that they immediately write to JAMES C MUNCH, 40 North Maple Avenue, Lansdowne, Pa, sending their name, business address and the names of the specific problems, with their nature which are being studied In order to facilitate completion of this report it is urged that this information be sent at once



The American Institute of Pharmacy

To be dedicated during the week of May 7th The landscaping has not been completed but is well under way The lighting fixtures outside are of bronze as are the main doors each weighing 1000 pounds Carved urns, exquisitely done out of a block of solid white marble, flank the main entrance The panels on either side of the main entrance are indicative of pharmacy and its service

THE EFFECT OF ETHYLENE GLYCOL ON THE SERUM CALCIUM OF THE RABBIT *

BY JAMES M DILLE

A report of work done under the direction of C L Wible College of Pharmacy, University of Nebraska, in partial fulfilment of the requirement for the degree of Master of Science in Pharmacology

Ethylene glycol, commonly known as glycol, is a diatomic alcohol which stands midway between the monatomic alcohol, ethanol, and the triatomic alcohol, glycerol Because of this relation it has been suggested as a substitute for these two compounds It has been used as a preservative of fruit juices and extracts, and in non-intoxicating beverages (1) It has also been introduced as a vehicle for certain medicinal compounds not easily soluble in water Its use as a vehicle for iodobismuthite is an example of this

Ethylene glycol when used in the above ways has been considered harmless Reid Hunt (2), (3), however, has seriously doubted this, while Hanzlik (4) claims toxicity only in large amounts which are never given for therapeutic purposes

Hunt claims that the toxic effects of ethylene glycol are due to oxalic acid formed by the oxidative processes of the body This seems to be true because the presence of oxalic acid can be demonstrated in the urine after the administration of ethylene glycol (5), (6) Calcium oxalate is present in the renal calculi formed by the administration of small amounts of ethylene glycol given over a long period of time

In this work it has been assumed that if oxalic acid is formed it will precipitate the calcium of the blood as an insoluble salt, and thus cause a fall in the calcium content of the blood

EXPERIMENTAL

The experimental work was divided into two parts In the first part the calcium changes occurring as the result of the administration of toxic doses were determined The rabbit was starved 24 hours to eliminate the changes due to ingested food At the end of this period the first blood sample was taken The glycol was then administered and the samples of blood taken at approximately 15-minute intervals for the first hour, and then at half or hour intervals until death occurred

In order to determine the effect of excessive loss of blood on the calcium level a control rabbit was run for each experiment Physiological saline was administered instead of ethylene glycol Samples of blood were taken at the same intervals as in the experimental animal

Four experiments of this sort were run In two of them the glycol was administered intraperitoneally, in the other two the intravenous method was used

All four of these experiments checked each other closely The results of a typical experiment are embodied in Table I and Fig 1

In the second part of the experimental work the effects of small doses of ethylene glycol given over a period of time were determined

* Scientific Section A PH A Madison meeting 1933

TABLE I —ACUTE TOXICITY

Control Rabbit A-7			Experimental Rabbit A-8		
Weight—2 84 Kg			Weight—2 32 Kg		
Dose—4 5 cc of sterile saline per Kg by intravenous injection			Dose—4 5 cc of ethylene glycol per Kg by intravenous injection		
Time	Calcium	Hmgb	Calcium	Hmgb	Remarks
9 00	14 4 mg	80	13 1 mg	85	
9 10	Inject saline		Inject ethylene glycol		
9 30	13 7 mg	80	12 8 mg	85	Accel , resp
9 45	13 8 mg	80	12 5 mg	80	
10 00	13 8 mg	80	12 6 mg	80	
10 30	14 2 mg	80	13 2 mg	80	Resp norm
11 00	14 1 mg	75	12 8 mg	80	
11 30	14 0 mg	75	12 7 mg	75	
12 00	14 2 mg	70	13 2 mg	70	Slight depr
1 00	14 0 mg	70	13 0 mg	70	
3 00	14 5 mg	60	13 2 mg	60	
6 00	13 8 mg	60	13 0 mg	50	Depression
8 00	13 2 mg	50	12 0 mg	45	Coma
8 35			Dead		
			No abnormal conditions observed in a gross examination of various organs		

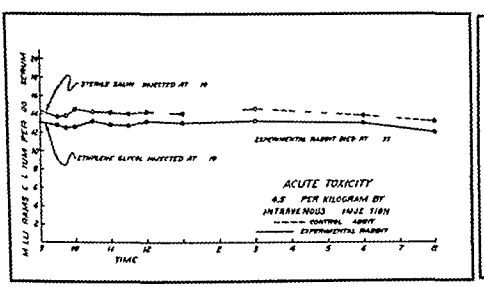


Fig 1

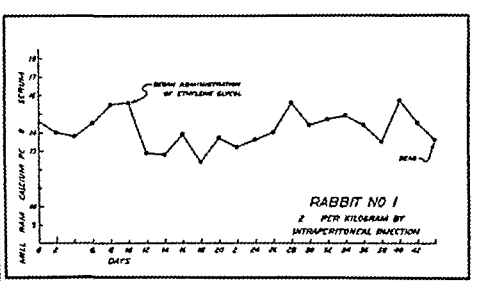


Fig 2

Calcium determinations were made on nine rabbits over a period of two weeks These were made every other day The daily administration of ethylene glycol was begun at the end of this two-week control period The intraperitoneal method of injections was used The rabbits were given doses varying from 3 to 4 cc of glycol per Kg per day

Diet is the cause of much variation in serum calcium, and in order to keep this as constant as possible, a diet of cabbage and oats was fed An excess of food was kept in the cage at all times The animals were kept on this diet a few days before starting the experimental period

A great deal of variations was encountered both in the control period and in the period during which the glycol was administered The accompanying table (Table II) and graph (Fig 2) may be considered typical of the results obtained in this part of the experimental work

In order to determine whether or not any deleterious results might occur from the loss of blood, hemoglobin determinations were made at the same time that the blood was collected In rabbits receiving the acute dose, the fall in the experimental animal was paralleled by a fall in the control rabbit In experiments on

chronic intoxication the hemoglobin remained constant during the two weeks' control period This indicates that the loss of blood required for the calcium determinations had no serious effect on the serum calcium After the administration of the glycol the hemoglobin fell

Serum calcium was determined by the method of Kramer and Tisdall (7), (8), using the modified washing technique of Clark and Collip (9) This is a volumetric procedure Calcium is precipitated from the serum, after the removal of the proteins, as calcium oxalate The precipitate is dissolved in sulphuric acid and titrated at 70° C against 0 01*N* potassium permanganate

TABLE II

RABBIT NO 1

Chronic Intoxication

Days	Calcium	Hmgb	Remarks
0	14 6 mg		
2	14 0 mg		
4	13 8 mg		
6	14 5 mg	75	
8	15 5 mg	80	
10	15 6 mg	80	Begin admin 2 cc per
12	12 9 mg	70	Kg daily
14	12 8 mg	70	
16	13 9 mg	60	
18	12 4 mg	55	
20	13 7 mg	50	
22	13 2 mg	50	
24	14 6 mg	50	
26	14 0 mg	50	Some depression
28	15 6 mg	50	
30	14 4 mg	50	Depression
32	14 7 mg	45	
34	14 9 mg	50	
36	14 4 mg	45	
38	13 5 mg	40	Weak
40	15 7 mg	45	Weak
42	14 5 mg	40	Very weak
44	13 6 mg	40	Dead
			Postmortem showed no adhesions, viscera appeared normal Stomach filled

DISCUSSION

Our experimental work seems to indicate that ethylene glycol has no marked effect on serum calcium This is established with fair certainty in the work with toxic doses Such variations as were present in the experimental animal were paralleled by variations over a similar range in the control

In the work involving the continuous administration of small doses, extensive fluctuations were noted throughout the course of the experiment, both in the control and experimental period These variations are probably due to diet It was thought that this could be minimized by keeping the diet as constant as possible, but this proved difficult McBorne and Campbell (10) state that normally the fluctuations of serum calcium may amount to as much as 5 or 6 mg per 100 cubic centimeters of serum Our variations over the entire period of the experiment amounted to 4 or 5 mg

Naturally it follows that any change in calcium due to the effect of ethylene glycol must needs be greater than the range of normal variations in order to be detected Therefore if there is any change, it is so small as to be covered by the normal variations

Oxalic acid is undoubtedly formed because in no other way can the presence of oxaluria, and calcium oxalate in the renal calculi be easily explained From our work we believe that the ethylene glycol is oxidized to oxalic acid so slowly that any change in serum calcium is too small to be easily detected

CONCLUSION

Variations in serum calcium of the rabbit do not depart from normal with the administration of ethylene glycol in toxic amounts or with small doses given over a period of time

REFERENCES

(1) Fuller *Ind Eng Chem*, 16 (1924), 642
(2) Hunt, *Ibid*, 24 (1932), 361
(3) Hunt, *Ibid*, 23 (1931), 836
(4) Hanzlik, Seidenfeld, Johnson, *J Pharm*, 41 (1931) 387
(5) Phol, *Arch exptl Path Pharmakol*, 37 (1896), 413
(6) Dakin, *J Biol Chem* 3 (1907), 57
(7) Kramer, Tisdall, *Ibid*, 47 (1921), 475
(8) Tisdall, *Ibid*, 56 (1923) 439
(9) Clark and Collip *Ibid* 63 (1925), 461
(10) McBorne, Campbell, *Biochem*, 26 (1932), 183

A STUDY OF THE CONSTITUENTS IN CASCARA SAGRADA EXTRACT I ISOLATION OF A RHAMNO-GLYCOSIDE OF EMODIN *[1]

BY HORACE L SIPPLE, C G KING AND GEORGE D BEAL [2]

For more than fifty years cascara sagrada extracts have been under investigation in order to determine the chemical nature of the compounds which are responsible for the characteristic cathartic properties The extracts are usually classified as anthracene, anthraquinone or emodin cathartics, because the characteristic constituents separated have been derivatives of methyl anthraquinones Dohme and Englehardt (1) reported finding a substance present in cascara which resembled frangulin (m p 237°), but their conclusion was questioned by Jowett (2) Beal and Tumminkatti (3) and Daels (4) have shown that the anthraquinone-type substances present are in part free and in part combined in a form which is liberated by hydrolysis It is now generally accepted that the anthraquinone derivatives are present in part in a glycosidic type of linkage (5), (6) Thorpe and associates have reported finding a glycoside (frangulin) of rhamnose and emodin in Rhamnus frangula (7) Definite identification of the most active substance or substances remains to be accomplished, however This study of the separation of the chemical constituents of cascara sagrada extract has been made to obtain further information leading toward the identification of the cathartically active constituent or constituents A glycoside of rhamnose and emodin has been identified as one of the substances present in considerable quantity

EXPERIMENTAL

A procedure has been developed for the first stages of a separation of the chemical constituents in an alcoholic extract of the dry cascara bark The various fractions thus obtained were representative of types of material present, providing a

* The authors are indebted to the Parke Davis and Co for a research fellowship grant (for H L S), and for supplying the cascara bark

[1] Contribution No 276 from the Department of Chemistry, University of Pittsburgh

[2] Assistant Director, Mellon Institute of Industrial Research

basis for continued study of the individual compounds The chief steps in the procedure may be summarized as follows

1 A 300 Gm sample of dry cascara bark was ground to approximately 10 mesh and extracted with 2 liters of 96% ethanol in a modified Soxhlet extractor for fifty hours Extraction with ethanol rather than water prevents hydrolysis of glycosides (an undesired side reaction that would occur in an aqueous extract due to the action of accompanying enzymes), thus affording greater assurance that any products isolated would represent original constituents of the bark The substances extracted by ethanol are chiefly water-soluble compounds Except for a small amount of lipid material they are precipitated from alcoholic solution upon the addition of solvents such as ethyl acetate ethyl ether isopropyl ether, petroleum ether, benzene or chloroform

2 The alcoholic extract was filtered, evaporated *in vacuo* below 50° C to approximately one-tenth of the original volume, treated with eight volumes of water and filtered

3 The filtrate was stirred for two hours with approximately 35 Gm of ferric hydroxide in suspension to give a clear filtrate which would not cloud when stirred with saturated NaCl solution

4 The liquid phase from step 3 was treated with 300 cc of a saturated solution of neutral lead acetate ($(CH_3COO)_2Pb\ 3H_2O$) and filtered, the small amount of precipitate formed being discarded

5 A basic lead complex was precipitated at a p_H of approximately 7 4 (phenol red) by the addition of dilute ammonium hydroxide The lead complex was centrifuged, the supernatant liquid decanted and discarded

6 The lead complex was decomposed in concentrated sodium sulphate solution, the mixture being made slightly acid with acetic acid Lead sulphate formed was removed by centrifuging and decanting the liquid phase Reagents such as phosphoric acid sulphuric acid and hydrogen sulphide have been avoided because of undesired side reactions which might occur

7 The decanted liquid was evaporated *in vacuo* to 100 cc , treated with 4 volumes of methanol and filtered Salts such as sodium sulphate, lead sulphate and some sodium acetate were precipitated More salts chiefly sodium acetate, were removed by evaporating the liquid to 50 cc and filtering

8 The liquid fraction was treated with one volume of absolute methanol, forming a brown precipitate which was centrifuged and discarded

9 After evaporation to one-half the original volume, the liquid fraction was treated with one volume of absolute ethanol A brown precipitate formed slowly The mixture was allowed to stand in the refrigerator over night, centrifuged and decanted

10 The liquid fraction after evaporation to dryness, *in vacuo* was taken up in 10 cc of absolute methanol The small amount of material not soluble in methanol was centrifuged and discarded

11 The methyl alcohol solution was treated with five volumes of absolute acetone causing the formation of an orange red precipitate The precipitate was separated in the centrifuge washed with acetone and all liquid phases combined

The precipitation of this acetone insoluble material was repeated until a uniform and reproducible product was obtained This product was then washed once with absolute acetone and dried *in vacuo* over calcium chloride The amount of this material recovered was approximately 5 Gm per Kg of original bark

12 The liquid phase from step 11 was evaporated *in vacuo* to a volume of 10 cc and treated with ten volumes of petroleum ether precipitating a small amount of red, oily material A very small amount of a yellow, wax-like substance was recovered by decanting and evaporating the petroleum ether liquid phase

The purified acetone insoluble material obtained in step 11 did not reduce Benedict's reagent An ether extract of an aqueous solution of the material gave no coloration with dilute ammonium hydroxide, indicating the absence of free hydroxy-methylanthraquinones (8), (9)

A 0 1-Gm sample of the orange-red material treated with 1% HCl in a boiling water-bath for 30 minutes gave a positive test with Benedict's reagent, and an

ether extract of the hydrolyzed material treated with dilute ammonium hydroxide gave the pink coloration characteristic of a free hydroxy-methylanthraquinone

A 2-Gm sample dissolved in a mixture of 70 cc of ethanol, 30 cc of water and 6 cc of HCl (concentrated), and heated on a boiling water-bath for eight hours gave water-soluble and water-insoluble products of hydrolysis After dilution with three volumes of water and evaporation *in vacuo* below 50° C in a stream of CO_2 to a volume of about 75 cc , the liquid was filtered in order to remove the water-insoluble product

The product removed by filtration was recrystallized from glacial acetic acid and, after drying over NaOH *in vacuo*, had a melting point of 250° C With pure emodin it gave a mixed melting point of 249° C The pure emodin had a melting point of 251° C It was concluded that this product of the hydrolysis was emodin

The water-soluble fraction, after neutralization with silver carbonate and decolorization with charcoal, was evaporated *in vacuo* below 50° C to a volume of approximately 20 cc The specific rotation recorded was approximately +5 0

The optical rotation of the unhydrolyzed glycoside from step 11 could not be determined readily because of the deep red color of solutions of the substance

The phenylosazone of the water-soluble product of hydrolysis gave a melting point of 181° C , and mixed with rhamnose phenylosazone gave a melting point of 179° C Rhamnose (Merck) gave a phenylosazone melting at 180° C

A portion of the water-soluble fraction distilled with HCl (sp gr 1 06) gave a distillate that colored aniline acetate paper yellow, a test for methyl furfural (5) It was concluded that the hydrolysis product soluble in water was rhamnose, and that the compound hydrolyzed was a glycoside of rhamnose and emodin

The recrystallized glycosidic substance (step 11) was inactive as a cathartic in doses of 120 mg (extract from 3-Gm bark) when given to mice The guinea pig dose was above 300 mg of the dry material Pure emodin fed to mice in 5-, 10- and 20-mg doses was also apparently inactive, although possibly slightly active at the 20-mg level

The minimum cathartic dose for mice of a concentrated aqueous extract of cascara sagrada was found to be equivalent to the extract from 50-mg bark The minimum dose per 250-Gm guinea pig was equivalent to the extract from 300 mg of bark

The alcoholic extract of cascara sagrada fed to mice was active in doses equivalent to the extract from 50 mg of bark According to Munch (11) the approximate minimum human dosage is equivalent to the extract from 1 Gm of bark

SUMMARY

A procedure has been developed for the first stages of a separation of the chemical constituents in an alcoholic extract of cascara sagrada

A glycoside of rhamnose and emodin has been identified as one of the substances present in this alcoholic extract

Biological tests have been made of the cathartic properties of (*a*) the rhamnose-emodin glycoside, (*b*) pure emodin, (*c*) an aqueous extract of cascara sagrada and (*d*) an alcoholic extract of cascara sagrada

LITERATURE CITED

(1) Dohme and Englehardt PROC A PH A , 45 (1897), 193
(2) Jowett *Ibid* 52 (1904), 288
(3) Beal and Tummınkatti, JOUR A PH A 14 (1925), 865, 15 (1926), 847
(4) Daels *Bull acad roy med Belg* , 29 (1919), 779, 30 (1920), 129
(5) George D Beal JOUR A PH A , 13 (1924) 215
(6) J H Hoch *Am J Pharm* , 105 (1933), 64
(7) Thorpe, Robinson and Miller, *J Chem Soc* , 57 (1890) 38, 61 (1892) 1
(8) George D Beal and Ruth Okey *J Am Chem Soc* , 39 (1917), 716
(9) J E Driver and G E Trease, ' The Chemistry of Crude Drugs" (1928), page 58 (Longmans Green & Co Ltd)
(10) C A Browne, 'Handbook of Sugar Analysis ' (1912) page 374 (John Wiley & Sons, Inc N Y)
(11) J C Munch 'Bioassays' (1931) page 778 (Williams and Wilkins Baltimore)

STUDIES IN PERCOLATION *

BY MILTON WRUBLE

DETANNATED TINCTURE OF CINCHONA

Tinctura Cinchonæ Detannata was official in the N F 1886, 1896 and 1906 The tannins were removed from the tincture as the name implies As early as 1866, Walker (1) briefly described a method by which he prepared a fluidextract of cinchona of a beautiful red color which held the cinchotannates in solution, by percolating with diluted alcohol Meumann, in 1886 (2), discussed the method for preparing detannated tinctures by means of ferric hydroxide His method could be applied to any drug but was outlined for cinchona The ferric hydroxide magma was added to the bark and intimately mixed The mixture was transferred to a percolator and percolation allowed to proceed

A year later, Meumann published a second paper (3) in which he recommended 2 parts of ferrous sulphate to 3 parts of bark Remington (4), in 1887, furnished a formula for the detannated tincture according to which the U S P fluidextract was treated with ferric hydroxide In 1888, Tiarks (5) reported on the method generally employed for preparing detannated fluidextracts He mentions the use of albumin, gelatin, lime and ferric hydroxide Keutmann (6), in 1903, described a method for detannating cinchona by percolating a mixture of the bark with calcium hydroxide after first forming a magma of the two with water and adding ammonium carbonate It is doubtful whether he obtained a completely detannated tincture since he reports a cherry-red color for the preparation made in this manner, whereas a completely detannated tincture is yellowish in color However, the red color may have been due to cinchona red (not to cinchotannic acid) which is reported to be *soluble* in ammonia water

Experimental Part—Cinchona bark, No 20 powder was used When assayed according to the U S P X, it yielded 4 70%, 4 32% and 4 26% of total alkaloids in as many assays The tannin content was determined by the hide powder method (7) Three determinations yielded 4 18%, 4 17% and 4 46%, respectively

* Scientific Section, A PH A , Madison meeting, 1933

The alkaloids of cinchona bark are supposed to be combined, in part at least, with cinchotannic acid No therapeutic value, so far as alkaloidal action is concerned, seems to be attached to this peculiar combination (8) Inasmuch as cinchotannic acid, under certain conditions changes to cinchona red, an insoluble phlobaphene, the presence of the cinchotannic acid is supposed to be responsible for unsightly depositions in the tincture and other galenical preparations Moreover, it has been reported that the cinchona red, as it is formed and deposited, occludes alkaloid Hence, the formation of a deposit in the tincture is not only a cause of unsightliness, but may bring about a reduction in the alkaloidal content as well (9)

It seemed desirable, therefore, to remove the cinchotannic acid from such preparations in which this agent was not specially wanted Instead of removing it from the tincture after the latter had been prepared, it seemed preferable to prevent its solution in the menstruum in the percolator For this purpose calcium and ferric hydroxides might be regarded, *a priori*, as equally suitable Moreover, either reagent would be expected to set free any alkaloids combined in the drug with cinchotannic acid, and thus possibly, aid in their solution

DETANNATION WITH CALCIUM HYDROXIDE

I Enough CaO was used to yield 100 Gm of $Ca(OH)_2$ when slaked with the theoretical amount of water The slaked lime was mixed intimately with 100 Gm of powdered cinchona bark, the mixture moistened with 150 cc of alcohol and packed into a cylindrical percolator Sufficient alcohol was added from time to time to yield 500 cc of tincture However, the percolate was collected in five fractions of 100 cc each These fractions were examined separately as was also a sixth fraction of 100 cc , *i e* , 100 cc more than the formula for the preparation calls for In the following table there will be found recorded the following data

A The length of time required for the percolation of each fraction
B The density of the percolate determined at 20° by means of a pycnometer
C The percentage of alcohol (by volume) ascertained by the U S P X method
D The amount of extractive determined by the U S P X method
E The alkaloidal content determined by the U S P X assay method (U S P X page 452)

	I	II	III	IV	V	VI
A	10 hrs	13 hrs	15⅔ hrs	16 hrs	15½ hrs	15 hrs
B	0 8359	0 8257	0 8280	0 8248	0 8195	0 8263
C	75 60%	76 80%	81 48%	81 08%	81 08%	86 96%
D	1 65%	0 77%	0 44%	0 14%	0 11%	0 15%
E	1 02%[a]	0 45%[b]	0 28%[c]	0 17%[d]	0 13%[e]	0 18%[f]

[a] The average of 2 determinations *viz* , 1 07% and 0 97%
[b] The average of 2 determinations, *viz* 0 45% and 0 45%
[c] The average of 2 determinations *viz* , 0 30% and 0 26%
[d] The average of 2 determinations *viz* , 0 15% and 0 18%
[e] The average of 2 determinations, *viz* , 0 14% and 0 11%
[f] The average of 2 determinations *viz* 0 20% and 0 16%

The dregs were further extracted to completion with the same menstruum and the following determinations made

Percentage extractive	1 96%
Percentage alkaloids	0 83%
Percentage tannin	0 11%

The resulting tincture was straw yellow in color Upon standing for several months the color assumed a reddish tint It gave no reaction with ferric chloride, hence may be assumed to have been free from tannin

A The period of percolation varied from 10 to 16 hours for each 100 cc percolate

B With minor irregularities the density of the five percolates constituting the tincture decreased with the extraction In this respect the fractional percolates differ from those in which the bark was not mixed with calcium hydroxide (10) It may therefore be that, in the regular percolation the cinchotannic acid is changed, in part at least, to an intermediate soluble product between it and the insoluble cinchona red which, on account of its greater density, causes a rise in density in the intermediate fractions

C Inasmuch as the alcohol used was 95 per cent by volume (not the official menstruum), it becomes apparent that the moisture of the air-dried drug was taken up, for the most part it would appear by the strong alcohol reducing its ethanol content by about 20 per cent From the table it also becomes apparent that the ethanol content of the percolate increased to about 81 per cent where it seemed to remain stationary so far as the official amount of percolate is concerned But even the final percolate to approximate exhaustion, contained about 8 per cent less ethanol than the menstruum employed It might be worth while to repeat the experiment in a dry atmosphere in order to ascertain whether the water taken up by the alcohol came from the mixture in the percolator (drug + $Ca[OH]_2$) or from the air

D The total extractive of the 500 cc of tincture contained but 3 11 per cent of extractive whereas percolate VI contained 0 15 per cent, making a total of 3 26 per cent (to this should be added the 1 96 per cent of the "exhaustive" extraction making a total of 5 22 per cent) as compared with 20 27 per cent for the drug not treated with calcium hydroxide Whereas the percentage of extractive decreases with each succeeding fraction of percolate, the percentages of extraction and the corresponding densities do not appear comparable Thus for percolates II and III the corresponding figures are

Density	0 8257	0 8280
Extractive	0 77%	0 44%

Although the density has increased slightly, the percentage of extractive has dropped materially Again we observe some of the irregularities recorded in connection with the percolation of cinchona by itself with alcohol (11)

E The alkaloidal content of the 500 cc of tincture is only 2 05 per cent, percolate VI, supposed to represent more complete extraction, contained but 0 18 per cent making a total of 2 23 per cent (Again there should be added 0 83 per cent making a total of 3 06 per cent) The crude drug had assayed 4 42 per cent These figures indicate a loss of more than 1 per cent (It has been assumed that in the deposition of cinchona red from the tannin—containing tincture, alkaloid is occluded by the cinchona red formed It may be possible that a like occlusion takes place in the percolators) Roughly speaking the second fraction of percolate contained somewhat less than one-half as much alkaloid as the first fraction the third fraction somewhat more than half as much as the second, the fourth somewhat more than one half as much as the third The fifth fraction contained not much less than the fourth, thus seeming to indicate that the last traces of alkaloid (12) still present were becoming more difficult to extract

The $Ca(OH)_2$ must effect the solubility of substances other than the 4 + per cent of tannins, such as quinic acid, etc

II As in Experiment I, 100 Gm of cinchona bark were mixed intimately with 100 Gm of $Ca(OH)_2$ and the mixture percolated with 95 per cent alcohol until 500 cc of tincture had been obtained The product was of a light straw color which darkened but little upon standing A slight whitish precipitate, presumably $CaCO_3$, resulted upon exposure to air By way of comparison the corresponding

U S P X tincture (however, 95 per cent alcohol was used) was prepared, also a third preparation using 67 5 per cent alcohol, which corresponds approximately to the menstruum of the U S P X In the last experiment the powdered cinchona bark was mixed with calcium hydroxide before it was packed in the percolator

Some of the properties of these three tinctures are herewith tabulated

		1 Tinct Prepared with 95% Alc and Lime	2 U S P Tinct	3 Tinct. Prepared with 67 5% Alc and Lime
A	Time of percolation	79½ hrs	85¾ hrs	88½ hrs
B	Sp gr 20°	0 8127	0 9302	0 9093
C	Percentage alcohol (vol)	86 46%	68 30%	55 42%
D	Percentage of extractive	0 78% (13)	7 93%	2 10%
E	Percentage of alkaloid	0 44% (14)	1 19% (15)	0 925% (16)
F	Action upon litmus	Alkaline	Alkaline	Alkaline (17)
G	Test with $FeCl_3$	Negative	Positive	Negative

A Whereas the periods of percolation varied as much as almost 10 hours it may be that this difference in time had no appreciable effect on the constants determined

B That the densities of 2 and 3, in the preparation of which a diluted alcohol had been employed, should be higher than that of 1 was to be expected The density of 1, however, is lower than that of the corresponding tincture reported under Experiment I

C The ethanol content of tincture 1 is appreciably higher than that of the tincture reported under Experiment I The ethanol content of tincture 2 is slightly higher than that of the menstruum employed, whereas that of tincture 3 is appreciably lower It would appear, therefore, that even 67 5 per cent alcohol exerts a dehydrating effect on $Ca(OH)_2$

Preparation of Quinic Acid —Approximately 500 Gm of the lime-treated dregs were extracted in a percolator with water until exhausted The water extract was evaporated to dryness, the residue boiled with 95 per cent alcohol, and filtered The alcohol removed material, which was of an amorphous character The residue, insoluble in alcohol, was dissolved in warm water, decomposed with oxalic acid, the calcium oxalate filtered off and the quinic acid crystallized

Fate of Tannic Acid in Drug —Lime apparently removes the tannins from cinchona in the form of calcium tannate Tannin determinations made on the dregs by means of the hide powder method, revealed little tannin These determinations were made by first treating the bark with HCl so as to free the tannin

Qualitative tests for tannins were made with ferric chloride and gelatin solution after first treating the bark with acid as stated above No tests for tannins were apparent The solutions were then carefully neutralized with ammonia and the tests with ferric chloride and gelatin repeated with the same results

Further attempts were made to learn of the function of the lime in the detannation of the cinchona bark After treating the dregs with HCl and filtering the aqueous solution, it was refluxed for 4 hours For comparison a decoction of cinchona bark was filtered, the same quantity of HCl added and refluxed in the same manner In the case of the bark, cinchona red was obtained and identified by precipitation as the barium compound, but in the case of the detannated dregs no cinchona red was obtained The experiment in the latter case was repeated without treating the dregs with HCl and the same results were obtained

PREPARATION OF TINCTURE OF CINCHONA U S P X, AND DETANNATED TINCTURE OF CINCHONA

III A liter of each of the tinctures was prepared from red cinchona bark (18) which assayed 6 37 per cent and 6 82 per cent (19), respectively, of total alkaloids (20) in as many assays by the U S P X method

The following data were determined on each tincture employing the methods as outlined in the U S P X

	U S P Tincture	Detannated Tincture (21)
Sp gr 20°	0 9125	0 8928
Extractive	32 30%	2 03%
Alkaloids	1 15% (22)	1 01% (23)
Test with $FeCl_3$	Tannins present	No tannins present

BIBLIOGRAPHY

(1) *Am J Pharm* 38 (1866) 411
(2) *Pharm Rund* 4 (1886), 197 (3) *Ibid* 4 (1886), 270
(4) *Drugg Circ* 3 (1887) 102
(5) *Pharm Rund* 6 (1888) 160
(6) *Suedd Apoth Ztg* (1903) from *Pharm Ztg*, 48 (1903) 823
(7) Villavecchia Applied Analytical Chemistry," 2 (1918), 338
(8) 'The properties and uses of cinchona correspond, proportionally in its strength with those of the following alkaloids (quinine, quinidine cinchonine, cinchonidine) The cinchotannic acid being sufficient to impart astringency that is wanting in the alkaloids ' Rusby, Bliss, Ballard, Properties and Uses of Drugs,' page 440
(9) While the precipitate consists largely of inert material, yet it carries down with it some of the active alkaloids and so weakens the preparation " Scoville, *Proc Tercentenary of Cinchona* (1931), 214
(10) Jour A Ph A 22 (1933) 641 (11) *Ibid*
(12) Solubility of cinchona alkaloids at 25°

1 Gm quinine dissolves in 0 8 cc ethyl alcohol
1 Gm quinidine dissolves in 32 cc ethyl alcohol
1 Gm cinchonine dissolves in 120 cc ethyl alcohol
1 Gm cinchonidine dissolves in 20 cc ethyl alcohol
(Merck's Index, 4th Edition)

(13) The total extractive of the five fractions was 3 11 per cent (See I)
(14) Two assays gave the same results
(15) No 1—1 12%, No 2—1 26%
(16) No 1—0 92% No 2—0 93%
(17) This was more alkaline than 1
(18) The tannin content of this bark was 2 3% and 2 5%, respectively, in as many assays Villavecchia "Applied Analytical Chemistry," 2 (1918) 338 The dregs showed a content of 0 31% and 0 42% tannins in as many assays
(19) This corresponds to an average total alkaloidal content of 13 19 Gm in the 200 Gm of cinchona used in the percolation
(20) Alkaloidal content of lime treated dregs—0 37% Alkaloidal content of U S P X dregs—0 09%
(21) This was prepared by the use of an excess of calcium hydroxide mixed intimately with the bark and percolated This tincture proved to be far more palatable than the U S P X tincture
(22) The average of three assays *viz* 1 16% 1 22% and 1 09%, respectively The alkaloidal content of the liter of tincture is 11 50 Gm
(23) The average of three assays *viz* 1 02%, 0 99% and 1 03% respectively The total alkaloidal content of the liter of tincture is 10 10 Gm

PHYSICS IN PHARMACY

PART V, A STRIP OF FILTER PAPER OR CAPILLARY HYDROSTATICS, CAPILLARY DIFFUSION AND CAPILLARY OSMOSIS * [1]

BY JOHN URI LLOYD, WOLFGANG OSTWALD AND HANS ERBRING

I PRESENTATION AND THEORY

1 Basic Experiment—About 35 years ago, the senior author, in a publication not easily accessible to physico-chemical investigators,[2] described the following experiment

Connect two glass tubes closed below, one being filled with a salt solution, the other with water, by means of a strip of filter paper, and bring the meniscuses in

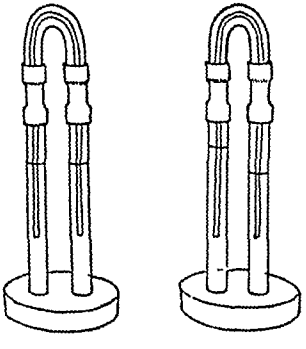


Fig 1*a* Fig 1*b*

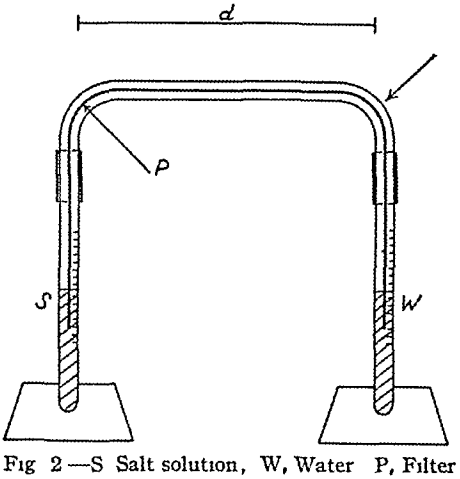


Fig 2—S Salt solution, W, Water P, Filter paper

both tubes to the same level by raising or lowering the tubes (see *Fig 1a*, original figure) Protect the system from evaporation by means of a connecting tube bent in U shape and two short pieces of rubber tubing

After a few hours, more plainly after a few days, it is found that a motion of the liquid has taken place The liquid column in the tube with the salt solution has increased, that in the tube containing water has diminished Hence, water has passed through the strip of filter paper into the salt solution (see *Fig 1b*, original figure)

The experiment looks very simple, its explanation, however, is not correspondingly simple We shall see in the following study that in this apparently "spontaneous" transport of liquid, quite a series of physico-chemical principles is involved which should be of interest to the thoughtful pharmacist In the following pages, we have taken up the problem of determining the nature of these forces in order to find an explanation of this effect

---

* Translated from the German by Dr Sigmund Waldbott

[1] Scientific Section, A PH A, Toronto meeting, 1932

[2] John Uri Lloyd, Etidorpha The Robert Clarke Company, 1897, page 138

It is evident that if this phenomenon can be seen to rest on a safe experimental and possibly also theoretical basis, it will be of interest in many a question of physical and colloid chemistry The senior author himself (*loc cit*) has pointed out that such movements of liquids would affect geological and hydrological questions, *e g*, as to the origin of salt lakes and subterranean water courses, thereby assuming that porous materials like sand, sandstone, etc, act in the same manner as filter paper Then the theories of 'swelling" suggest themselves Concerning this, different authors, *e g*, Proctor and Wilson, J Duclaux, D Jordan Lloyd, J Loeb, Northrop and Kunitz, etc, have recently considered "osmotic" forces in the movement of water in the swelling of gels although the existence of "cell structure" or semipermeable membrane ' in swelling gels has not always been proved, nor is it even always considered probable

In filter paper, also, we have movement of water without cell- or (honey) comb structure, and without membranes Such movements of liquids "without membranes" might be of importance also in the physiological problems of movements of water in the organism

2 Method of Operation—The following method was used in these experiments Two glass tubes, closed at one end, each 10 cm long and of 0 5-cm diameter, and provided with a millimeter scale, were filled to about $^3/_4$ with the solutions to be examined, and placed upon a suitable support Through a U-shaped glass tube, also of 0 5 cm diameter, a thin strip of filter paper, 2–3 mm wide, was drawn, both ends of the paper projecting from the tube The two strips of paper were introduced into the two liquid cylinders, immersed to a definite distance in the liquids, and two short pieces of rubber attached to the ends of the U tube were drawn over the edge of the cylinders The pieces of rubber were covered with a layer of paraffin or "pizein," which protected the system quite well from loss by evaporation

The resulting arrangement is represented in *Fig 2* In all experiments, the paper was immersed in the liquid to a depth of 3 cm The filter paper was used, either dry or moistened with the solutions employed For an account of the differences noted, see *Section 5* Also, different grades of filter paper have been used, see *Section 6* At the beginning of the experiment, the meniscuses must be exactly at the same height in both cylinders, this is easily attained by vertical change of position of the cylinders

It is furthermore important that the connecting piece *d* shall always be in an exactly horizontal position

The changes in the position of the meniscuses were read at both scales by means of the lens The experiments were carried out at ordinary room temperature, since it was found that the use of thermostats was superfluous as the temperature factor proved to be very insignificant Cf *Section 10*

3 Repeating the Basic Experiment—The following is an example taken at random from the many experiments which we conducted according to the above method, in order to demonstrate that the basic experiment is reproducible, and at the same time to characterize the Effect quantitatively

Table I shows an experiment with saturated *ferric chloride* solution The length of the horizontal connecting piece was 9 cm (see *d* in Fig 2) In this experiment the filter paper was used *dry* Upon connecting the two liquids by the filter paper, there is at first capillary rise in

both tubes, in this case, salt solution and water meet on the side of the salt solution It was only after this capillary connection was completed that the leveling of both liquid surfaces was done

TABLE I

System $FeCl_3$ (saturated) *vs* Water $d = 9$ cm

1	2	3	4	5	6	7
Duration of Exp Hours	Height in Cyl S Cm	$FeCl_3$ Increase in Cyl S Mm	Height in Cyl w Cm	H_2O Decrease in Cyl w Mm	Total Difference Mm	Liquid Taken Up by Paper Col 5 Minus Col 3 Mm
0	5 00	0 0	5 00	0 0	0 0	0 0
16	5 1	1 0	4 65	3 5	4 5	2 5
42	5 15	1 5	4 5	5 0	6 5	3 5
62	5 22	2 2	4 35	6 5	8 7	4 3
80	5 25	2 5	4 33	6 7	9 2	4 2
100	5 3	3 0	4 25	7 5	10 5	4 5
Days						
8	5 35	3 5	4 15	8 5	12 0	5 0
11	5 35	3 5	4 15	8 5	12 0	5 0
14	5 35	3 5	4 15	8 5	12 0	5 0
16	5 35	3 5	4 2	8 0	11 5	4 5
20	5 3	3 0	4 25	7 5	10 5	4 5
25	5 28	2 8	4 3	7 0	9 8	4 2
40	5 2	2 0	4 35	6 5	8 5	4 5

The headings of the 7 columns in Table I are self explanatory, the results, also represented graphically, in Figs 3 and 4, furnish a quantitative characterization of the effect

From *Table I* and the *diagrams*, the following results are noteworthy

1 The principal effect takes place within about the first 8 days

2 Upon longer duration of the experiment, the effect again decreases, the movement of the liquid becomes retrograde however, the descent takes place more slowly than the rise

3 The decrease in the cylinder containing water runs somewhat parallel to the increase in the salt solution, but is of much higher absolute value than the latter

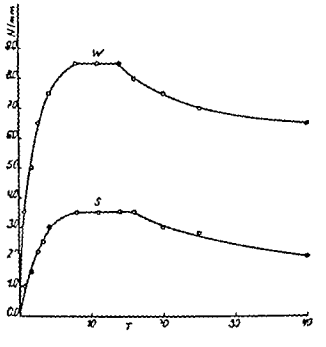


Fig 3 —N, Difference of level in mm , T Time in days Curve W shows decrease in the water cylinder, Curve S shows increase in the salt cylinder

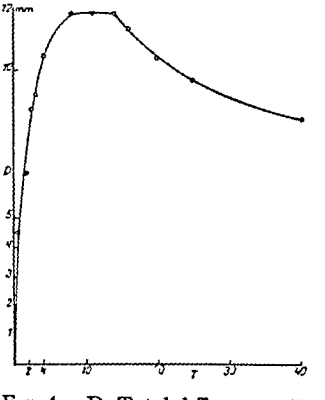


Fig 4 —D, Total difference, T Time in days

A considerable quantity of the liquid "disappears" in the experiment, this is especially noticeable in *Fig 3* The "vanished" liquid is contained partly in the capillary spaces of the paper and contributes in part to the swelling of the filter

paper, another part is condensed in the form of droplets along the glass walls, especially that of the U tube

The general course of the Effect may be well visualized by the aid of *Fig 5*, in which the height of the liquid columns attained in the time periods I, II, III and IV are brought out by hatched lines

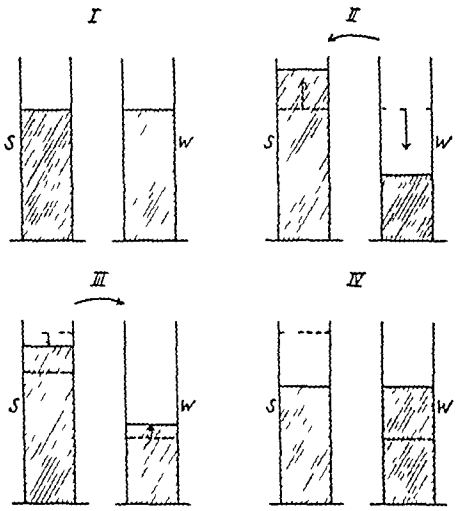


Fig 5

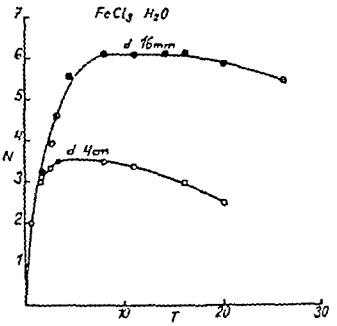


Fig 6 —N, Increase of level in mm , T Time in days

As one might be inclined to regard the numerical value of the Effect, in this case a maximum difference of 12 mm as insignificant, we present herewith in *Table II* an example to show how large an effect may be attained under certain conditions By merely leaving $FeCl_3$ in contact with undissolved $FeCl_3$ at the bottom of cylinder S, and conducting the experiment as before, there will be, during the same period of time, differences of level of at least 28 3 mm , the maximum not yet being reached

TABLE II

System $FeCl_3$ plus undissolved $FeCl_3$ at the bottom, *vs* Water d = 12 cm Paper wetted at start

Duration Hours	$FeCl_3$—Increase Mm	H O—Decrease, Mm	Total Difference Mm
2	1 0	3 0	4 0
10	5 0	7 0	12 0
18	7 0	9 0	16 0
24	9 0	11 5	20 5
Days			
2	10 5	14 5	25 0
4	10 5	15 5	26 0
8	11 5	15 5	27 0
15	12 5	15 8	28 3

II FURTHER EXPERIMENTAL DETAILS

Before passing on to the theory of the phenomenon, we wish to give from our large and varied experimental material a few experimental details in order that the effect herein considered may be viewed from other angles

4 Influence of Length of the Capillary Connecting Piece—In the foregoing discussion, the capillary connecting piece, *i e*, the strip of filter paper, is of essential importance It therefore became of interest to know in what manner the dimensions, particularly the length (*d*) influences the Effect Summing up, we find a distinct *increase of the Effect with increase of length, provided,* however, that the *paper is previously moistened with the solution* Experimental details for this are given in the following *Tables III, IV, V, VI,* and *Figs 6* and *7,* salt solutions used against water were saturated *Ferric Chloride* and saturated *Barium Chloride* solutions

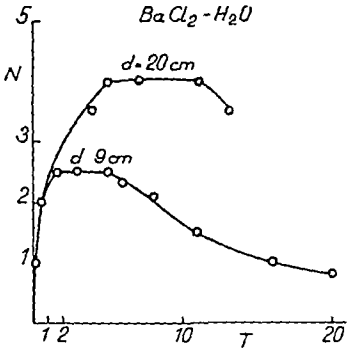


Fig 7—N Increase of level in mm, T Time in days

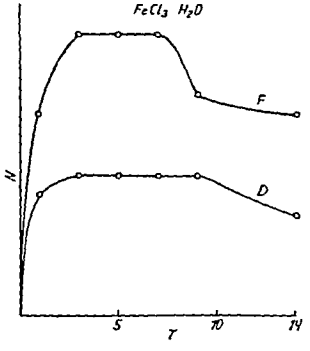


Fig 8—N Increase of level in mm, T, Time in days, F, Moist D, Dry

TABLE III—INFLUENCE OF LENGTH OF *d* (*d* = 4 CM)

System $FeCl_3$ (saturated), *vs* Water Paper moistened with $FeCl_3$ at start

Duration Hours	$FeCl_3$—Increase Mm	H_2O—Decrease Mm	Total Difference Mm	Liquid Taken Up by Paper Mm
16	2 0	4 0	6 0	2 0
42	3 0	8 0	11 0	5 0
62	3 3	8 5	11 8	5 2
80	3 5	8 5	12 0	5 0
100	3 5	8 5	12 0	5 0
Days				
8	3 5	8 0	11 5	4 5
11	3 5	7 5	10 8	4 2
16	3 0	7 5	10 5	4 5
20	2 5	7 3	9 8	4 8

TABLE IV

Same as Table III except *d* = 16 cm Paper moistened at the start

Duration Hours	$FeCl_3$—Increase Mm	H_2O—Decrease Mm	Total Difference Mm.	Liquid Taken Up by Paper Mm
48	3 2	8 0	11 2	4 8
66	3 9	10 0	13 9	6 1
80	4 6	12 0	16 6	7 4
110	5 6	13 5	19 1	7 9

Days				
8	6 1	14 0	20 1	7 9
11	6 1	14 0	20 1	7 9
14	6 2	14 0	20 2	7 8
16	6 2	14 0	20 2	7 8
20	5 9	13 8	19 7	7 9
30	5 5	13 4	18 9	7 9

TABLE V —INFLUENCE OF LENGTH OF d (d = 9 CM)

System BaCl (saturated), *vs* Water Paper moistened with BaCl at start

Duration Hours	BaCl—Increase Mm	H O—Decrease Mm	Total Difference Mm	Liquid Retained by Paper Mm
8	1 0	1 7	2 7	0 7
16	2 0	3 0	5 0	1 0
42	2 5	4 0	6 5	1 5
Days				
3	2 5	5 0	7 5	2 5
4	2 5	5 0	7 5	2 5
5	2 5	5 0	7 5	2 5
6	2 3	5 0	7 3	2 7
8	2 1	5 0	7 1	2 9
11	1 5	5 0	6 5	3 5
13	1 5	5 0	6 5	3 5
16	1 0	4 8	5 8	3 7
20	0 7	4 6	5 3	3 9

TABLE VI —INFLUENCE OF LENGTH OF d (d = 20 CM)

System Same as in Table V Paper moistened at start

Duration Hours	BaCl—Increase Mm	H O—Decrease Mm	Total Difference Mm
22	2 0	2 2	4 2
Days			
4	3 5	4 0	7 5
5	4 0	5 0	9 0
7	4 0	6 0	10 0
11	4 0	6 0	10 0
13	3 5	6 0	9 5

With $FeCl_3$ (*Tables III* and *IV*), we see that the fourfold length of the capillary connecting piece results in practically doubling the Effect (increase of level in cylinder S) Relatively still more pronounced is the Effect with $BaCl_2$ (*Tables V* and *VI*), where tubes with d = 9 cm and 20 cm are used

In both cases, we also note a faster decline from the maximum in the shorter connecting tube Experiments with still longer tubes have shown that the errors caused by the large quantities of the liquid retained by the paper and by condensation of liquid become so great as to render results inexact, hence longer connecting tubes cannot be recommended

5 *Influence of Preliminary Wetting* —In starting the experiment, we may allow both liquids to rise and meet in the dry paper, or we may first moisten the paper with the salt solution, then continue with the experiment Moistening with water would practically have the same effect as the use of dry paper, since water

as a rule rises very much faster than the solution, in this case, both liquids would meet in cylinder S

We found the Effect to be notably stronger and better reproducible if the solution is allowed to migrate into the filter paper, as high as into the beginning of the descending branch of the connecting tube on the water side (see arrow in *Fig 2*) Waiving numerical data for this experiment, we show in *Fig 8* the graphic results of such a parallel experiment with wet and with dry filter paper

6 Influence of the Quality of Paper —Filter papers are usually characterized by their transversal permeability, *i e*, according to the average diameter of their pores A paper with very small-sized pores is, *e g*, that of Schleicher and Schull No 602 (hard), the size of pores is about 2 2μ [1] Again, filter papers may be characterized by their "imbibing ability," *i e*, by the speed of capillary rise of water in them This is a longitudinal property of the paper, caused by an especially numerous aggregation of narrow capillaries Such a paper is that of Schleicher and Schull No 604 (soft), it has considerably larger transversal pores than the hard paper No 602 The paper used in the preceding experiments was intermediate between these two extremes

TABLE VII —INFLUENCE OF QUALITY OF PAPER PAPER WETTED AT START

System $FeCl_3$ (saturated) *vs* Water d = 12 cm

Duration Hours	$FeCl_3$—Increase Mm	H_2O—Decrease Mm	Total Difference Mm	Liquid Retained by Paper Mm
		Paper No 604 (Soft)		
22	5 0	8 5	13 5	3 5
70	7 0	10 5	17 5	3 5
Days				
5	7 0	10 5	17 5	3 5
7	7 0	13 0	20 0	6 0
9	5 5	16 0	21 5	10 5
14	5 0	18 5	23 5	13 5
Weeks.				
8	2 0	16 0	18 0	14 0
		Paper No 602 (Hard)		
Hours				
70	1 0	4 0	5 0	3 0
Days				
5	1 5	6 5	8 0	5 0
7	2 5	7 5	10 0	5 0
9	3 5	8 5	12 0	5 0
14	3 0	8 5	11 5	5 5
Weeks				
8	1 5	7 5	9 0	6 0

Table VII and *Fig 9* show considerable difference existing in the activity of the soft, felt-like paper, compared with that of the hard and dense paper No 602 The Effect is of much greater magnitude with the former than with the latter With No 604, the maximal increases of level are more than twice as much as with

[1] Cf Wo Ostwald Kleines Praktikum der Kolloidchemie " 7th Edition page 26 (Steinkopff, Dresden)

No 602 The kinetics of rise are likewise different, with No 604, the rise takes place far much faster than with No 602

There is also a notable and plausible difference in the quantities of liquid retained in the filter paper, cf the last column in *Table VII*

7 Clogging of the Capillaries by Formation of a Precipitate —In a systematic study on the relation of size of pores in unglazed porcelain and osmotic activity by *L Bigelow* and *F E Bartell* (see later), Bartell found, for example, that porcelain

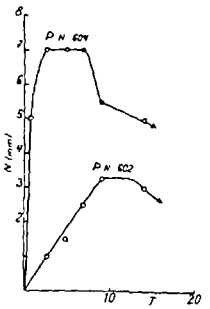


Fig 9 —N, Increase of level in mm T Time in days, P, Filter paper

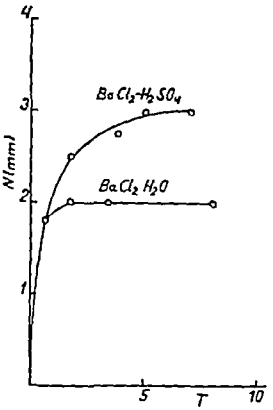


Fig 10 —N, Increase of level in mm , T, Time in days

with pores smaller than 0 4μ is of direct use as an osmotic cell He also diminished the width of the pores by precipitating $BaSO_4$, S, $PbCrO_4$, CuS, etc , within the capillaries of the pores, this likewise caused an increase of the capillary effect

Although a piece of filter paper longitudinally soaked with liquid is evidently different from a transversally soaked wall of a porcelain cell, we may believe that in both cases a narrowing of the capillaries, resp , the pores will act in the same direction Accordingly we have also tried to diminish the width of the fibrillary capillary spaces by depositing within them finely divided precipitates

TABLE VIII

System A $BaCl_2$ (saturated) *vs* Water d = 4 cm Paper dry at the start

Duration Hours	$BaCl_2$—Increase Mm	H_2O—Decrease Mm	Total Difference Mm
16	1 8	2 5	4 3
42	2 0	3 5	5 5
62	2 0	4 0	6 0
80	2 0	4 5	6 5
Days			
8	2 0	5 0	7 0

Now Clogging the Capillaries by Precipitation

System B BaCl (saturated), *vs* 0 1*N* HSO_4 d = 4 cm

Hours	Mm	Mm	Mm
16	1 8	2 8	4 6
42	2 5	3 5	6 0
90	2 5	4 5	7 0

Days			
5	3 0	5 0	8 0
7	3 0	5 2	8 2

In *Table VIII* and *Fig 10* are shown the results of an experiment (*System B*), in which the capillary spaces are diminished in size by precipitation of $BaSO_4$ within them, water placed against the saturated $BaCl_2$ solution in *System A* is substituted by tenth-normal sulphuric acid

The narrowing of the capillary tubes is seen to result in the increase of our Effect

8 Experiments with Other Substances —The experiments described thus far were carried out with $FeCl_3$ and $BaCl_2$ *vs* water Without presenting numerical values, we see from *Figs 11* and *12* that the effect is obtained also with *KCl* (univalence) and with $AlCl_3$ (trivalence), and with non-electrolytes such as *Cane sugar*

Experiments we carried out with *Urea* will be described in *Section 10* [1]

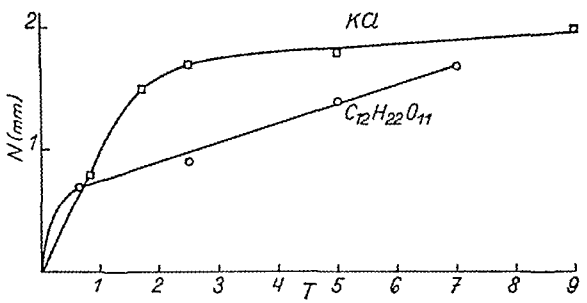


Fig 11 —N Increase of level in mm T, Time in days Paper dry at start

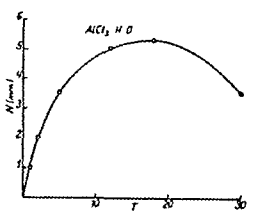


Fig 12 —N, Increase of level in mm , T, Time in days, Paper wet at start

It might appear strange that cane sugar gives but a relatively small Effect as compared with that of the salts However, when comparing the curves in *Fig 11*, we see that only the *beginning* of the curve of the sugar has been measured, while the KCl curve, after about 8 days, runs practically horizontal, the curve for the sugar, during the same time, shows a decided, almost linear rise The thought suggests itself to hold the high molecular weight of the sugar, and the high viscosity of its solutions responsible for the smaller velocity displayed in producing the Effect In addition, this experiment with cane sugar was conducted at the time when the importance of preliminary wetting had not yet been recognized

9 Quantities of Liquids Retained by the Filter Paper —In the first part of this paper, attention was called to the relatively large quantities of liquid held by the filter paper These quantities vary, not only according to the kind of filter paper used (cf *Section 6*), but also according to the nature of the solution

(*End of First Instalment*)

[1] Alcohols used in the experimental apparatus herein described showed *peculiar movements* concerning which we shall report in a later communication

Eighty second annual meeting of AMERICAN PHARMACEUTICAL ASSOCIATION and dedication of the American Institute of Pharmacy during week of May 7th See Transportation under department "Societies and Colleges"

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy N W cor Lombard and Greene Sts , Baltimore Maryland

PHARMACEUTICAL PREPARATIONS

Anon
A stabilized tincture of digitalis
Pharm J 132 (1934) 111
Breddin H
Preparation of tincture and extract of cinchona by diacolation
Pharm Ztg 79 (1934) 163
Day Paul L
The extractability of Vitamin G (B) from yeast by various acetone-water and methyl alcohol-water mixtures
J Am Chem Soc 56 (1934) 452
Eschenbrenner H
Preparation of an extract of digitalis for rectal therapy
Apoth Ztg 49 (1934) 189
Fantus Bernard *et al*
A study of vehicles for medicines
Jour A Ph A 23 (1934) 127
Gilmour John
Note on ether and iodides in mixtures
Chem & Drug 120 (1934) 104
Havenhill L D , and Smolt, M G
Aromatic Elixir
Jour A Ph A , 23 (1934) 124
Heading W R , and Veness B R
A new liquid extract of cinchona
Pharm J , 132 (1934), 137
Holdermann Richard
Viscosity of tinctures
Pharm Ztg , 79 (1934) 10
Hunter Robert Eric
Mercury ointment, B P
Pharm J , 132 (1934) 112
Hunter Robert Eric
Note on ointment of mercury, B P
Chem & Drug 120 (1934) 103
Schou Svend Aage
The galenical preparations of the Danish Pharmacopœia, 1933
Arch Pharm og Chem , 41 (1934) 88 125
Williamson H S
Mist Magnesii Hydroxidi et Paraffini Liquidi
Pharm J 132 (1934), 167

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Fourneau E , *et al*
A new class of hypnotics, derivatives of propionamide
J pharm chim , 19 (1934) 49
Frazier W L
Emetine in typhoid fever
Clin Med Surg 41 (1934) 73
Kelly Edgar A and Lynn E V
The value of Senecio in medicine
Jour A Ph A , 23 (1934) 113
Kindler, Karl and Peschke Wilhelm
New and better ways to build up pharmacologically important amines VIII Synthesis of papaverine-like compounds
Arch Pharm 272 (1934), 80
Magidson, O J , *et al*
Derivatives of 8-aminoquinoline as antimalarials III
Arch Pharm , 272 (1934), 74
Masserman, Jules H and Goldsmith, Harry
Dinitrophenol Its therapeutic and toxic actions in certain types of psychobiologic underactivity
J A M A 102 (1934), 523
Munch, James C
Antidotes III Thallium
Jour A Ph A , 23 (1934) 91
Munch, James C , and Ponce Amelia M
The bioassay of Picrotoxin and Cocculus Indicus preparations
Jour A Ph A , 23 (1934) 98
Pfister F F and Webster S D
A skin manifestation from the excessive administration of vitamins
J A M A 102 (1934) 533
Rowe, L W
National standards for Tincture Digitalis with special reference to U S P X and B P 1932 standards
Jour A Ph A 23 (1934) 104

BOTANY AND PHARMACOGNOSY

Edman Gosta
Picrasma and quassia woods

Farm Revy, 33 (1934) 45
Gisvold Ole
Phytochemical Notes The sterols from Stramonium seed
Jour A Ph A 23 (1934), 106
Goudswaard, Arie
Oxalate content of various plants including some medicinal plants
Pharm Weekbl, 71 (1934), 114
Rotter, Gundis and Funkel A
Histochemical identification of the heart glucosides in digitalis and strophanthus
Pharm Presse, Beilage 5 (1934) 9
Segi, S
Pharmacognostical examination of zedoary flowers
J Pharm Soc Japan, No 622 (1933) 264

ALKALOIDS AND GLUCOSIDES

Frangouli, J, and Vassiliou A
Determination of free acid in quinine salts
Praktika, 7 (1932) 293–297, *Chem Zentr*, 2 (1933) 916, through *J Soc Chem Ind*, 53 (1934), 77B
van Itallie L
An international method for the determination of morphine in opium
Pharm Weekbl, 71 (1934), 4
Kwada and Matsukawa
Chemical investigation of the saponins VII
J Pharm Soc Japan No 623 (1934), 8
von Miko, Julius
Assay of theobromine sodio-salicylate by the argentometric method
Pharm Monatsh, 14 (1933), 279
Offerhaus, C, and Baert C G
Anesthetics, particularly cocaine and novocaine
Pharm Weekbl, 70 (1933) 1298
Orechoff, A *et al*
Alkaloids of Vinca pubescens
Arch Pharm, 272 (1934) 70

ESSENTIAL OILS

Adams, Maxwell, and Oakberg, Francis S
Essential oil in desert plants III Examination of the Oil of Artemisia Tridentata Typica
J Am Chem Soc, 56 (1934), 457
Anon
Chemistry and applications of Oil of Hops
Perf & Ess Oil Rec 25 (1934) 14
Chandrasena J P C and Lourensz H
Essential oil of Canarium Zeylanicum
J S C I, 52 (1933), 362T through *J Soc Chem Ind*, 53 (1934), 77B
Jermstad, Axel, and Ostby Ottar
Norwegian caraway oil
Pharm Zentralh, 75 (1934), 34
Kuhn, A
Rapid method for the determination of essential oils in drugs and plants
Pharm Ztg, 79 (1934), 99
Parry, Ernest J
The essential oils of the Swiss Pharmacopœia
Chem & Drug, 120 (1934) 95
Vanin, I I, and Tschernojarova, A A
Essential and fatty oils from N Caucasian coriander seeds
J Appl Chem Russ, 6 (1933), 922–932 through *J Soc Chem Ind*, 53 (1934), 78B

ANALYTICAL METHODS AND RESULTS

Dyckerhoff, H, and Miehler, H
Value of commercial pancreas preparations
Apoth Ztg 49 (1934), 161
Feigl, F, and Krumholz, P
Detection of copper in pharmaceutical preparations
Pharm Presse Beilage 5 (1934), 19
Grant, Julius
The standardization of volumetric solutions
J Soc Chem Ind 53 (1934) 76
Hoshall, Edward M, *et al*
The assay of Caffeine Sodio-Salicylate and Elixir of Sodium Salicylate
Jour A Ph A, 23 (1934), 118
Ionescu-Matiu, Al, and Popesco A
Determination of cyanides and sylphocyanates by the mercurimetric method
J pharm chim, 19 (1934) 54
Kahane Ernest
Determination of arsenic in medicaments
J pharm chim, 19 (1934), 116
Koolhaas, D R
Analysis of Derris root and determination of rotenone
Bull Jard bot Buitenzorg 3 (1932), 12, 563–574 *Chem Zentr*, 2 (1933) 749–750, through *J Soc Chem Ind* 53 (1934), 77B
Koszegi D
Colorimetric method for following the diminution of free phosphorous content of phosphorous pills
Pharm Zentralh 75 (1934) 34
Manchester Testing House
Tests of Surgical dressings
Pharm J, 132 (1934), 167
Pound James R
Properties of liquids
J Soc Chem Ind, 53 (1934), 71

Rohmann, C , and Rohmann, U
Evaluation of medicinal charcoal by the antipyrine method
Pharm Ztg , 79 (1934), 122
Rupp, E
Use of hydrogen peroxide and potassium iodide for the determination of chromium
Arch Pharm , 272 (1934) 57
Schrader, Hellmuth
Measurement of viscosity as a means of evaluating fluidextracts
Pharm Ztg , 79 (1934), 88
Scott, Arthur F , and Hurley Frank H
A procedure for the preparation of uniform nephelometric suspensions
J Am Chem Soc , 56 (1934), 333
Soldi, A
Behaviour of fluidextracts of medicinal plants towards Wood's light
Ann chim applicata, 23 (1933), 455–462, through *J Soc Chem Ind* , 53 (1934), 77B
Viebock, F
New method for the determination of phosphorus in phosphorated oil
Arch Pharm , 272 (1934), 84, 88
Ware, Alan H
Use of resorcinol in chemical analysis
Chem & Drug , 120 (1934), 74, 129
"Ziekenhuis en Gemeente Apothekers"
Suggested methods for the assay of some new remedies
Pharm Weekl , 70 (1933), 1330

ORGANIC CHEMICALS

Harris, S E , and Christiansen, W G
Mercurated substitution products of Diphenol Isatin
Jour A Ph A , 23 (1934) 108
Kitamura, R
Reaction of organic sulphur compounds with hydrogen peroxide
J Pharm Soc Japan, No 623 (1934), 1

THE REPUTED INFLUENCE OF ULTRAVIOLET LIGHT ON THE YIELD OF DIGITALIS GLUCOSIDES *

BY C S LEONARD AND JOHN M ARTHUR

It has been claimed that the yield of active drug substances in certain drug plants can be altered by differences in the quality of the light under which they are grown Thus, McCrea (1) has claimed that if seedlings of *Digitalis purpurea* are sprouted and grown for a time under a glass having a high ultraviolet transmission, then set into the field, dried powdered leaf made from these seedlings will yield more cardiac glucosides, as tested by bioassay than will that from similar plants sprouted under window glass and set out into the field

In examining this work it appeared to the writers that a number of factors were not controlled in Miss McCrea's experiments and that some of these factors could be kept constant during the experimental period with the facilities available at the Boyce-Thompson Institute The experiments here reported have been in progress for three years Two strains of seed of *Digitalis purpurea* were obtained, one from Professor Edward Kremers of the University of Wisconsin and grown at the Pharmaceutical Experiment Station there, the other was obtained from a local seedman of the New York district (called Vaughan's strain) Both species were germinated and grown under the standard conditions possible in two air-conditioned greenhouses of the Boyce-Thompson Institute, but one group of each was under "Sunlit" glass with which one greenhouse is glazed, the other under ordinary window glass The "Sunlit" glass used varied in thickness from 2 5 to 3 mm Coblentz and Stair (2) found an average transmission for "Sunlit" glass at wave-length 302 mμ of 65% when new and 39% after solarization by exposure to a mercury vapor

* Contribution from the Burroughs Wellcome and Company Experimental Research Laboratories Tuckahoe N Y and from the Boyce-Thompson Institute for Plant Research Inc , Yonkers, N Y

arc The average thickness of the samples tested was 2 3 mm Similarly, the figures determined for "Vita" glass for like wave-length and thickness were 48% and 22%, respectively Coblentz and Stair have pointed out that a variation in thickness of 0 1 mm produced a change in transmission of 1 2% at a wave-length of 302 mμ The limit of transmission of the window glass is 313 mμ No difference of morphology of the plants (size, etc) has been seen

I EXPERIMENTS IN WHICH THE PLANTS WERE KEPT FOR THREE TO FOUR MONTHS AFTER GERMINATION IN THE EXPERIMENTAL GREENHOUSES AND WERE NOT SET INTO THE OPEN

One strain was started July 29, 1930 (Vaughan's), the other in September (Wisconsin), hence the two sets of plants were not of identical age at the time of sampling On January 12, 1931, six sturdy plants were selected at random from each group for each powder, two powders being made from each group All but one were dried under the same conditions in the attic of the Boyce-Thompson Institute One was dried in an electric oven at about 45° C Eight powders and tinctures were made by the U S P method [1] A table below gives the results

TABLE I —REPORT OF ASSAY BY THE U S P ONE-HOUR FROG METHOD OF TINCTURES MADE FROM DIGITALIS LEAF FROM PLANTS 4–6 MONTHS IN THE GREENHOUSE

Tincture Number	Per Cent U S P	Total Solids Gm per 100 cc	Variety	Greenhouse	Age Months
1	126 ± 10*	4 06	Wisconsin	Window glass	4
2	120 ± 10*	4 11	Wisconsin	Window glass	4
3	200 ± 10*	3 26	Vaughan	Window glass	6
4	150 ± 10*	3 17	Vaughan	Window glass	6
5	109 ± 10*	3 75	Wisconsin	'Sunlit' glass	4
6	150 ± 10*	3 78	Wisconsin	"Sunlit" glass	4
7	150 ± 10*	3 08	Vaughan	'Sunlit" glass	6
8	133 ± 10*	3 20	Vaughan	"Sunlit" glass	6

* Probable error in U S P bioassay (A O A C)

Comments on Table I —Three Wisconsin samples were low in bioassay, one high Three Vaughan samples were high in bioassay, one low The average for the Vaughan samples is higher than the Wisconsin samples but the plants are several months older so this is to be expected The average bioassay for the samples from both sources grown under window glass (149%) is higher than that for those grown under the 'Sunlit" glass (135%) Hence, any conclusion from this would be that the extreme ultraviolet region is detrimental to the yield of alkaloids However as the error of bioassay is ±10%, and there is an additional slight error due to possible variations of extraction and to the individual variations, which despite the presence of six plants in each powder were likely to be evident, we believe that the difference seen, namely 14% U S P, is within the possible error of the experiment

II EXPERIMENTS IN WHICH THE PLANTS WERE GROWN 4 MONTHS IN THE GREENHOUSES AND SET OUT INTO THE FIELD FOR 5 MONTHS

The Wisconsin strain only was used The seed was planted in January These plants were kept in the greenhouses under the same conditions as in the first experiment On removal to the open field a part were put into a plot of ground at the Boyce-Thompson Institute, a part at another plot located at the U S A

[1] Type Process P of the U S P X without the modification for the adjustment to U S P strength of assayed tinctures, but rather making directly to 1000 cc

Works of Burroughs Wellcome & Co , Inc , both in Yonkers, N Y A set of six sturdy plants was taken from each field and each group (previously under ordinary glass and previously under "Sunlit" glass) They were dried by spreading on a paper in an attic as before Four powders and tinctures were made by the U S P method and assayed by the U S P one-hour frog method The results are given in Table II

TABLE II

Tincture Number	Per Cent U S P	Total Solids Gm per 100 cc	Field	Greenhouse	Age Months
9	140 ± 10	2 20	B W & Co	Window glass	9
10	84	2 34	B W & Co	Sunlit glass	9
11	84	2 70	Boyce-Thompson	Window glass	9
12	70	2 24	Boyce Thompson	'Sunlit" glass	9

Comments on Table II —The results tend to be lower than in the previous test, apparently because of the time of sampling Those specimens originally under window glass were up to 70% U S P higher in potency by bioassay than specimens otherwise of similar history, but originally under Sunlit glass In different fields the variation in specimens of identical history is evident This variation is from 14% to 56% U S P The evidence thus afforded that the glucoside yield varies enormously with soil conditions seems significant

III EXPERIMENTS IN WHICH THE PLANTS WERE GROWN 9 MONTHS IN THE GREENHOUSE AND NOT SET INTO THE FIELD

A portion of the seedlings of Experiment II were not set out into the field but were continued for the nine months in the air-conditioned greenhouses Two sets of 6 sturdy plants were taken from each group They were dried as before Four powders and tinctures were made by the U S P method and assayed by the U S P one-hour frog method The results are given in Table III

TABLE III

Tincture Number	Per Cent U S P	Total Solids Gm per 100 cc	Greenhouse	Age Months
13	60 ± 10	3 40	Window glass	9
14	84	3 34	Window glass	9
15	112	3 22	'Sunlit" glass	9
16	76	2 96	"Sunlit" glass	9

Comments on Table III —The specimens grown throughout in the greenhouse also show considerable variability although here set in the same soil and kept under the same conditions as regards all factors but light The difference in the same greenhouse of two specimens is 36% U S P in the case of the specimens under 'Sunlit" glass and 24% in the case of the ordinary glass The average of the former is 94%, the average of the latter is 72% Thus, here the specimens under "Sunlit" glass are higher in glucoside yield by 22% U S P if the averages are compared but the differences between specimens of identical history is greater (24–36% U S P) and if the 84% specimen from the greenhouse with ordinary glass were compared with the 76% specimen from the house with "Sunlit" glass, the former would appear to have the advantage

IV EXPERIMENTS IN WHICH THE PLANTS WERE GROWN IN THE GREENHOUSES FOR 8 MONTHS, SET INTO THE FIELD OVER THE WINTER AND HARVESTED JUST BEFORE FLOWERING TIME

As the plants grown in the previous experiments had no cold dormant period, they failed to send up flower stalks and flower The objection might be raised that

these plants were abnormal because they did not flower The time specified in the pharmacopœias for harvest of digitalis is just before the flowering time Seedlings of the Wisconsin strain were grown therefore in the greenhouse for 8 months They were germinated in January, repotted once and set out in October into two fields, one at the Boyce-Thompson Institute experimental ground and the other at the Works of Burroughs Wellcome and Company After the usual winter dormant period of these perennials, many plants produced abundant and vigorous foliage the following spring and sent up the usual flower stalk in May They were harvested May 27th, over 17 months after germination and after 8 months of life in the greenhouses and 9 months in the field Six specimens were collected, 2 sets of 6 sturdy plants from the Boyce-Thompson plants of each group and one set from each group grown at the Burroughs Wellcome field The results are given in Table IV

TABLE IV

Tincture Number	Per Cent U S P	Total Solids Gm per 100 cc	Field	Greenhouse
17	104 ± 10	2 20	Boyce-Thompson	Window glass
18	74	2 27	Boyce-Thompson	"Sunlit" glass
19	61	2 20	Boyce-Thompson	Window glass
20	95	2 36	Boyce Thompson	"Sunlit" glass
21	87	2 43	B W & Co	Window glass
22	77	2 44	B W & Co	'Sunlit" glass

A specimen from plants similarly treated except grown under window glass of unknown light transmitting power gave a potency of 114% U S P

Comment on Table IV—It is evident from comparing this group to Group I that the yield of active glucosides is greater in dried powdered leaf from young plants, 6 months of age than from older plants whether these are about to flower or not The young plants display average yields nearly double that of the older This agrees with the observation of Miss McCrea (3) For the plants of pharmacopœial standard age (flowering time) the average of the specimens under window glass is 84% that of the specimens under 'Sunlit" glass is 82% The difference is negligible, far within the error of the experiment

DISCUSSION

Finally, we may average and compare all the results of each type obtained in the four experiments on the total of 22 specimen tinctures made from the specimens, 11 with a history at least as seedlings of growth with no ultraviolet light, 11 supplied with ultraviolet light The specimens under window glass average 110 4%, the specimens under "Sunlit" glass average 102% This difference is about 8% U S P and is well within the error of bioassay and hence it is not believed that the difference is significant, particularly in view of the wider variations which are to be seen in specimens of identical history For example, specimens 17 and 19 are two lots of the same sort of specimens They show 33% U S P difference Numbers 15 and 16 similarly are comparable and show 36% U S P difference Only in the experiments of Group III were the specimens under "Sunlit" glass higher than the specimens under window glass and then less than the above 36% No consistent, significant differences were found in yield of glucosides as were found by McCrea The above experiments demonstrate the great variation in glucoside yield which can be seen in sets of plants of identical prior history set into different fields or even from different regions of the same field Even when

grown in pots, with a presumably uniform soil and kept under controlled and constant greenhouse conditions, two lots of 6 plants each, both under "Sunlit" glass, show as much as 36% U S P variation The averages obtained in the experiments here reported do not permit any assumption that the influence of the extreme ultraviolet region of sunlight, either during the seedling stage or throughout the life of the plant, affects the yield of active glucosides

SUMMARY

No significant differences in glucoside yield could be observed between digitalis plants grown under a glass having a higher ultraviolet transmission and those grown under ordinary window glass, whether the plants were kept until sampled in the air conditioned greenhouses or were set out after some months of such treatment into the open field

Digitalis plants were found to require a cold dormant period in order to induce flower stalk formation Miller (4) and Thompson (5) have reported a similar cold period requirement for the flowering of two other biennials, celery and cabbage

Dried powdered leaf from young plants 4 to 6 months old has nearly double the glucoside content of that from older plants (9–17 months old) whether a flower stalk is formed on the older plants or not

The authors desire to thank Dr S H Culter and Mr R W Henderson for preparing the U S P tinctures, and Dr Merl E Fisk and Dr Marvin R Thompson for the assay results herein reported

BIBLIOGRAPHY

(1) Adelia McCrea Effect of Ultraviolet Light upon *Digitalis purpurea* " *Science* 67 (1928) 277

(2) W W Coblentz and R Stair Data on Ultra-Violet Solar Radiation and the Solarization of Window Materials," *Bureau of Standards, Journal of Research* 3 (1929), 629-689

(3) Adelia McCrea Prolonged Effect on *Digitalis purpurea* of Exposure under Ultraviolet Transmitting Glass," *Science*, 71 (1930) 346

(4) Julian C Miller, A Study of Some Factors Affecting Seed-Stalk Development in Cabbage " *Cornell University Agri Expt Sta Bull* 488 (1929)

(5) H C Thompson, Premature Seeding of Celery,' *Ibid* , 480 (1929)

STUDY OF GERMICIDAL AND ANTISEPTIC ACTIVITIES OF SOME DERIVATIVES OF 8-HYDROXY QUINOLINE *

BY E MONESS AND W G CHRISTIANSEN

8-Hydroxy quinoline has bacteriostatic properties and is generally used in the form of its sulphate, which is water soluble Matzumura (1) prepared 5-8-dihydroxy quinoline, and the presence of the additional hydroxyl suggested the possibility that such a compound may be soluble in an aqueous medium without resorting to salt formation

This compound was prepared, as well as two chlorinated derivatives of it, and all were found to be soluble in a vehicle containing 30 parts of alcohol, 40 parts of

* Section on Practical Pharmacy and Dispensing, Madison meeting 1933

glycerin and 30 parts of water Such a solution was found to be miscible with water in all proportions In the germicidal and bacteriostatic tests 0 25% solutions of these compounds in alcohol-glycerin-water were used and diluted with suitable amounts of water at the time of test

Chlorination of 5-8-dihydroxy quinoline always yielded a mixture of the mono-chlor and di-chlor compounds Recrystallization from alcohol separated the mixture into two fractions one was largely 7-chlor, 5-8-dihydroxy quinoline admixed with some non-chlorinated 5-8-dihydroxy quinoline, while the other was largely 6-7-dichlor, 5-8-dihydroxy quinoline, admixed with some of the mono-chlor derivative

The germicidal and bacteriostatic activity of these compounds was found to be only moderate as seen from the following table

Solution	Dilution at Which Compound Kills				Dilution at Which Compound Is Bacteriostatic.	
	Typhoid		Staphylococcus		Typhoid	Staphylococcus
	5 Min	10 Min	5 Min	10 Min	24 Hours	24 Hours
5 8 dihydroxy quinoline	< 1–400	1–400	< 1–400	< 1–400	1–10,000	1–10 000
84 2% mono-chlor compound + 15 8% non-chlorinated dihydroxy quinoline	1–400	1–400	1–400	1–400	1–10,000	1–20 000
72 6% dichlor compound + 27 4% mono-chlor derivative	1–400	1–400	1–400	1–400	1–10 000	1–20,000

All the solutions are unstable due to the fact that the compounds oxidize easily, this is characteristic of compounds in which two hydroxyl groups are para- or ortho- to each other Due to this oxidation the solutions darken with time from an original yellow-brown color to a dark red, and deposit a slight dark sediment

According to Klarmann (2) the mono-ethers of hydroquinone exhibit germicidal power far greater than that of the original substance It was thought that by preparing mono-ethers of 5-8-dihydroxy quinoline a similar increase in germicidal activity could be obtained, coupled with the additional advantage that such compounds would not be subject to oxidation and would give stable solutions With this object in view, two compounds were prepared—the mono-ethyl and butyl ethers of 5-8-dihydroxy quinoline

At first an attempt was made to fix the position of the alkoxy group by starting with 8-ethoxy quinoline, which was nitrated to 5-nitro-8-ethoxy quinoline and reduced to the amino derivative This compound could be diazotized without any difficulty, but the attempt to replace the diazonium group by hydroxyl was unsuccessful, the yield was insignificant, and the reaction yielded complicated tarry and resinous compounds Consequently the method of Klarmann was used, and the mono-ethers were prepared by the direct alkylation of 5 8-dihydroxy quinoline, the mono ethers were separated from the di-alkylated derivatives by treatment

with alkali When this method is used the exact position of the alkoxy group cannot be stated—it may be either in the 5- or 8-position

When solutions of these compounds were made up in a vehicle consisting of a mixture of 30 parts of alcohol, 40 parts of glycerin and 30 parts of water, it was found that unlike the solutions of 5-8-dihydroxy quinoline, they were not miscible with water in all proportions Thus a 1–400 solution of the mono-ethyl ether would become turbid on the addition of one volume of water, and would deposit crystalline material when two more volumes of water were added A 1–400 solution of the mono-butyl ether deposited some crystalline material on being diluted with only one volume of water However, both compounds formed water-soluble salts with great ease the addition of one equivalent of tartaric acid to the alcohol-water-glycerin solutions to the ethoxy and butoxy compounds made it possible to dilute these solutions with water without having precipitation occur The ethoxy compounds dissolve in aqueous tartaric acid, sufficient material was not available to enable us to make a similar test with the butoxy compound

The germicidal and bacteriostatic activities were greatly enhanced, especially the germicidal activity of the butoxy compound

Solution	Dilution at Which Compound Kills				Dilution at Which Compound Is Bacteriostatic	
	Typhoid		Staphylococcus		Typhoid	Staphylococcus
	5 Min	10 Min	5 Min	10 Min	24 Hours	24 hours
Mono ethoxy compound of 5 8 dihydroxy quinoline	1–400	1–400	1–800	1–800	1–200 000	1–400,000
Mono butoxy compound of 5 8 dihydroxy quinoline	1–2000	1–2000	1–800	1–800	None	1–200 000

It is not quite clear why the bacteriostatic test for the butoxy compound was negative for typhoid bacilli, and this will be checked in the course of work now in progress on derivatives of hydroxy quinoline

EXPERIMENTAL

5-8-Dihydroxy Quinoline—Ten Gm of 5-nitroso 8-hydroxy quinoline was dissolved in a solution of 75 cc of concentrated hydrochloric acid in 2700 cc of water The solution was kept at 95° C and 16 Gm of iron filings was added to it with constant stirring in small portions over a period of one hour The solution was then stirred for one more hour at 95° C It was filtered and evaporated to a volume of 150 cc On cooling a crystalline mud separated out, which was filtered off The dark brown crystalline substance was resuspended in 150 cc of a mixture of equal parts of concentrated hydrochloric acid and water, brought to a boil and cooled In this way 8 Gm of light brown crystals of the hydrochloride of 5-8-dihydroxy quinoline was obtained A sample dissolved in water and precipitated with sodium carbonate gives a grayish brown substance, melting point 180° C The melting point for the purified substance as given in the literature is 181–183° C

Chlorination of 5-8-Dihydroxy Quinoline

5-8-Dihydroxyquinoline	4 Gm
Glacial acetic acid	80 cc
Sulphuryl chloride	6 cc

The compound was dissolved in the acid and to the solution was added slowly and with mechanical stirring a solution of the sulphuryl chloride in a little glacial acetic acid A large excess of SO_2Cl_2 was used, since it was found that with a small excess the chlorination proceeded only partially

An orange precipitate was obtained and was filtered off, dissolved in water and neutralized with sodium bicarbonate

The filtrate was evaporated to a small volume and a second crop of orange crystals was obtained

Yield—3 8 g of a gray crystalline substance, m p —150° C

Analysis

Chlorine	Found	21 22%
	Calculated for C_9H_6O NCl	18 30%
	Calculated for $C_9H_5O_2NCl_2$	30 88%

Evidently some of the di-chlor compound was also formed By a fractional crystallization from alcohol we obtained two fractions, one analyzing as a mixture of 72 6% di-chlor and 27 4% mono-chlor compound, with a melting point of 163° C and the other as a mixture of 84 2% mono-chlor compound and 15 8% non-chlorinated 5-8-dihydroxy quinoline, with a melting point of 128° C

Both substances are easily soluble in alcohol and a solution in alcohol and glycerin is miscible with water in all proportions

Preparation of the Mono-ethyl Ether of 5-8-Dihydroxy Quinoline —4 03 Gm of 5-8-dihydroxy quinoline and 3 9 Gm ethyl iodide were dissolved in 4 cc of alcohol The solution was refluxed and a solution of 1 5 Gm KOH in 4 2 cc water was added dropwise during one hour, the refluxing was continued for 3 hours A solution of 2 Gm of KOH in a little water was then added, and on cooling the reaction mixture was extracted with ether The ether extract was washed several times with a 10% solution of KOH, these alkaline extracts were combined with the alkaline reaction mixture and precipitated with acetic acid A somewhat tarry precipitate was obtained which was purified by extracting with ether This ether extract was washed with water, purified with charcoal, dried over anhydrous sodium sulphate and the ether was evaporated off, 0 8 Gm of a yellowish crystalline substance was obtained, m p 96–98° C

Analysis Found—C, 69 7%, H, 5 37%, calculated for $C_{11}H_{11}O_2N$—C, 69 7%, H, 5 82%

Preparation of the Mono-butyl Ether of 5-8-Dihydroxy Quinoline —2 65 Gm of 5-8-dihydroxy quinoline and 2 22 Gm butyl bromide were dissolved in 2 65 cc of alcohol This solution was refluxed and a solution of 1 Gm of potassium hydroxide in 3 cc of water was added dropwise during an hour The refluxing was continued for another 3 hours The reaction mixture was worked up in the same manner as the ethoxy compound

Yield—0 7 Gm of yellowish white crystalline substance, slightly contaminated with a trace of an oily admixture, m p 92° C

Analysis Found—C, 70 60%, H, 6 50%, calculated for $C_{13}H_{15}O_2N$—C, 71 80%, 6 90%

Both the ethoxy and the butoxy derivatives of 5-8-dihydroxy quinoline form orange, water-soluble salts, such as the hydrochloride and the tartrate

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E R Squibb and Sons and we gratefully acknowledge their assistance

BIBLIOGRAPHY

(1) Matzumura *J A C S* 53 (1931) No 4, 1406
(2) Klarmann *Ibid* 54 (1932), 298

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES, E R SQUIBB AND SONS, BROOKLYN, N Y

A STUDY OF VEHICLES FOR MEDICINES *

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

V COMPOUND ELIXIR OF CHLORAL AND BROMIDE

As an "horrible example" of an undesirable N F preparation, must be mentioned the Compound Mixture of Chloral and Potassium Bromide," which in addition to 20% each of chloral and bromide has 0 2% each of extracts of cannabis and of hyoscyamus added to it The extracts are triturated with pumice and then the hot solution of the chloral and bromide is added, the mixture is set aside for twenty-four hours with occasional agitation, whereupon all but a trace of the extracts of cannabis and hyoscyamus is unceremoniously filtered out Any statement as to the quantity of cannabis and hyoscyamus extracts contained in the finished preparation is a mere guess and worse The quantity present is certainly not as given in the official dose statement, but a great deal less In view of the unsatisfactory formula, it is not to be wondered at that it has a usage of only 0 25 per 10,000 prescriptions, according to the Gathercoal survey

We must, therefore, either delete these insoluble ingredients or so modify the formula that they will remain in solution With this in view we have experimented a great deal and would like to propose deleting the "Compound Mixture of Chloral and Potassium Bromide," which would be entirely justified by its limited use, and to introduce the following preparation to supersede the one deleted

ELIXIR CHLORALIS ET BROMIDI COMPOSITUM

Compound Elixir of Chloral and Bromide

Synonym—Compound Mixture of Chloral and Potassium Bromide

Chloral Hydrate	62 5 Gm
Sodium Bromide	125 0 Gm
Soluble Gluside	0 5 Gm
Fluidextract of Cannabis	12 5 cc
Fluidextract of Hyoscyamus	25 0 cc
Alkaline Elixir of Eriodictyon (1), to make	1000 0 cc

Mix the solid ingredients by trituration in a mortar and dissolve them in 900 cc of alkaline elixir of eriodictyon Add the fluidextracts of cannabis and of hyoscyamus and enough of the aromatic elixir of eriodictyon to make 1000 cc Average dose 4 cc (1 teaspoonful)

---

* From the Laboratory of Pharmacology of the College of Medicine of the University of Illinois

Average dose contains

Chloral Hydrate	0 25 Gm
Sodium Bromide	0 50 Gm
Fluidextract of Cannabis	0 05 cc
Fluidextract of Hyoscyamus	0 10 cc

The following reasons for the modification of the N F V formula may be advanced

1 The new preparation contains the ingredients *in the relative proportion to their average dosage* the proportions of the "mixture" (N F V) being entirely irrational even if all of the ingredients were retained

PROPORTION OF ACTIVE INGREDIENTS

	Dosage in Mixture of N F V per Teaspoonful	Average U S P Dosage	Proposed Dosage per Teaspoonful
Chloral	0 8 Gm	0 5 Gm	0 25 Gm
Bromide	0 8 Gm	1 0 Gm	0 50 Gm
Ext Cannabis	0 008 Gm	Fldext 0 1 cc	0 05 cc
Ext Hyoscyamus	0 008 Gm	Fldext 0 2 cc	0 10 cc

The proportions advocated in the new preparation should make it much more efficient, in view of the fact that we have here a synergistic mixture in which each of the ingredients, producing sedative and hypnotic action in a different way, should "potentize" each other, increasing the desired effect, while the undesirable effects are less than would be produced by a larger dose of each of the ingredients It will be seen, for instance, that inasmuch as chloral is at least twice as powerful as the bromide the dose of the chloral and bromide are not in the proper relation in the old formula The same thing is true of the relation of cannabis and hyoscyamus dosage Furthermore, the dose of these two in the old formula is ridiculously small, even if all of it were retained

2 *All the active ingredients are retained* in the new formula there being no filtration To be able to do this we have introduced an elixir of high (approximately 50%) alcohol content to improve the solvent qualities of the vehicle

3 *To make the preparation as palatable as possible,* we have introduced the alkaline elixir of eriodictyon and added soluble gluside in the proportion of 1 to 2000

4 *The title "Elixir"* is proposed for the new preparation, because being sweet and alcoholic this title appropriately classifies it Furthermore, as has been shown by the Gathercoal survey, a Compound Elixir of Chloral and Bromide has much more extensive use than the Mixture

5 *The "average dose"* proposed for the new preparation contains one-half of the U S P average dose of each of the ingredients "Burgi's rule," which postulates that, "a mixture of substances each of which produces the same effect in a different way increases the potency of each of its ingredients," justifies one to believe that the proposed preparation, in teaspoonful doses, would have a greater sedative effect than half of the average dose of each of its ingredients Hence, a teaspoonful should be an effective dose If it is desired to give a full average dose of each of the ingredients, all that is necessary is to administer two teaspoonfuls of the new preparation which will, no doubt, act more powerfully than if each of the ingredients were given alone

CONCLUSIONS

1 It is proposed that the Compound Mixture of Chloral and Potassium Bromide be deleted from the National Formulary

2 That a Compound Elixir of Chloral and Bromide be introduced in its stead

3 This elixir to contain the active ingredients in the relative proportion of their average U S P dosage

4 The preparation to be stabilized and made palatable by means of the alkaline elixir of eriodictyon

---

THE PROTECTION OF PRESCRIPTION LABELS WITH LACQUER *

BY WILLIAM J HUSA[1] AND LYDIA M HUSA

Considering the dangers involved when mistakes are made in the use of medicines, it is of the utmost importance that pharmacists take proper precautions to insure the legibility of labels on prescriptions and to make sure that the patient understands the directions With the wide-spread use of the typewriter at the prescription counter, the difficulties arising from poor penmanship are disappearing Pharmacists who do not have typewriters available should take care to write legibly, using pens which are in good condition, it would also be advantageous to use a better grade of ink, such as India ink, which is so much more permanent than ordinary writing fluids

The better type of pharmacist pays particular attention to the labeling and other points in the finishing of the prescription and he may sum up his activities by saying that every prescription must be "right" when it leaves the store If a well-typed, properly affixed label becomes smeared and illegible through handling by the patient, the pharmacist is apt to feel that this is the responsibility of the patient He may say that the patient should be careful not to spill the medicine on the label, that handling with wet or soiled hands should be avoided, and finally that if the label shows signs of becoming illegible, it should be returned to the pharmacist for relabeling All this may be true, yet any pharmacist who critically examines his own home medicine chest will admit that the gradual loss in legibility of labels is a real menace The bad condition of many of the labels on prescriptions brought back for refilling is frequently a troublesome factor at the prescription counter

From these considerations it is evident that the adoption of a practical method for increasing the permanency of prescription labels would bring about a worthwhile improvement in pharmaceutical service The use of a label varnish naturally suggests itself and the older pharmaceutical journals often gave formulas for label varnishes, which, however, for one reason and another, have never come into general use by pharmacists

---

* Presented before the Section on Practical Pharmacy and Dispensing, A PH A , Madison meeting, 1933

[1] Head Professor of Pharmacy, University of Florida

NOTE See abstract of discussion in minutes of Section on Practical Pharmacy and Dispensing

During the past fifteen years, with the development of a new type of nitrocellulose giving solutions of low viscosity, and the introduction of synthetic resins and new solvents, great strides have been made in the manufacture and use of lacquers in the finishing of automobiles, furniture, etc The use of clear lacquer (containing no pigment) has come into use for protecting the bindings of books and similarly lacquer is used for increasing the permanency of shipping labels, etc

For the lacquering of labels, a quick-drying, colorless or light-colored lacquer is preferable Commercial label varnishes are now available which are advertised as being quick-drying, acid proof, alkali proof, oil proof, alcohol proof and washable These have been recommended for use in chemical stock rooms, research laboratories and museums

Since it appeared that the use of a suitable lacquer on prescription labels would be advantageous, we have made some tests along this line, using one of the commercial label lacquers It was observed that the lacquer penetrated the labels too much, making them somewhat translucent, particularly at first It was thought that this could be corrected by first applying a coat of U S P collodion Comparative tests were carried out, using coatings as follows on the labels of prescription bottles

No 1 Lacquer
No 2 Collodion + lacquer
No 3 Lacquer + lacquer
No 4 Collodion + lacquer + lacquer
No 5 Plain label (for comparison)

The coatings were applied with a half-inch lacquer brush Where successive coatings were used, they were applied five minutes apart

Examination of the labels showed that the use of an undercoat of U S P collodion was advantageous, as it dried rapidly and largely prevented penetration of the lacquer, which thus remained to a greater extent on the surface where it is needed In case of No 3 (two coats of lacquer), the drying appeared to be slow and this was further evidenced by the fact that the labels on two such bottles adhered when put away together after standing about half an hour after the coatings were applied

As a test of efficiency, aromatic fluidextract of cascara sagrada was smeared on the labels The plain label was badly stained, of course, and could not be washed without damage The label having one coat of lacquer (No 1) stained slightly and showed slight staining after washing with water, also it was evident that one coat gave insufficient protection against water In case of No 2 (collodion + lacquer) the fluidextract did not stain the label, which could easily be washed perfectly clean, this was also true of No 3 (two coats of lacquer)

From the results of our tests, the following recommendations are made

1 For prescription labels a coat of U S P collodion followed by a coat of label lacquer
2 For stock bottles bottles used in hospital wards, etc a coat of U S P collodion followed by two coats of label lacquer

The above recommendations are made on the basis that an extra coat of lacquer is desirable for bottles subjected to particularly hard or frequent usage, as in hospital wards

The protection of labels as described, making them washable and durable, is not a frill which can just as well be omitted, but represents, rather, a technique which should be used in every retail and hospital pharmacy In the hospital pharmacy, much time will be saved, since it will not be necessary to replace labels so frequently The permanence and greatly extended period of legibility of such labels will prevent accidents and save lives We need only recall the recent tragedy in an Australian hospital, where the life of a patient was lost because a young nurse administered belladonna instead of syrup of figs The report of the case (1) states that "both were ordinary white glass bottles, and the labels were stained and almost illegible '

There is no reason why pharmacists should not take pride in sending out prescriptions with labels which are not only legible when they leave the store, but which are so durable and washable that they will remain legible a long time afterward

REFERENCE

(1) Jour A Ph A , 21 (1932) 822

Gainesville Fla

A STUDY OF AROMATIC ELIXIR *

BY C O LEE AND MARSHALL CLOSE [1]

An elixir, similar in formula to the present official aromatic elixir was made official in the U S Pharmacopœia VI, with the title, Elixir Aurantii The synonym was Simple Elixir It was made by percolating cotton, which had been soaked with oil of orange The menstruum used was composed of water 3 parts and alcohol 1 part

In the U S Pharmacopœia VII, this elixir was replaced by Elixir Aromaticum, and the formula considerably modified Compound spirit of orange took the place of oil of orange of the previous formula and cotton as a filtering agent was replaced by precipitated calcium phosphate The only change in the formula in the U S Pharmacopœia VIII was that purified talc replaced the precipitated calcium phosphate Aromatic Elixir, in title, formula and process of making, has remained unchanged through the revisions of the Pharmacopœia since the Eighth

This fact should not be taken to mean that the formula is, in all respects, wholly satisfactory A review of the literature reveals that an endless number of complaints have been made about it, mainly, because it consumes so much time in filtering, while others are, that it is too sweet and its alcoholic content too high for certain uses as a vehicle

Like many of the workers who have preceded us in the study of this preparation, we have sought to acquaint ourselves with the problem, with the hopes of being able to suggest an improved formula To this end our study presents a review of the literature, under the following headings

---

* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933

[1] Instructor in Pharmacy Ohio Northern University, Ada Ohio, Graduate Student School of Pharmacy Purdue University Summer Sessions 1931 and 1933

1 Flavoring Substances
2 Alcohol and Sugar Content
3 Clarifying Agents and Methods of Making

A summary of our studies and recommendations is also given

THE FLAVORING AGENTS USED IN AROMATIC ELIXIR

In 1871 (1) the Newark Pharmaceutical Association proposed the following formula for aromatic elixir

Cort Aurantii	4 drachms
Sem Coriand	2 drachms
Sem Angelicæ	2½ drachms
Cocci Cacti	1 drachm
Spt Vini Deod	12 ounces
Aquæ	10 ounces
Glycerinæ	5 ounces
Syrupi	5 ounces

Directions were given to percolate 2 pints This, it was stated is a pleasant vehicle for administering nauseous remedies" In the 1871 Report of the Committee on Unofficial Formulas of the AMERICAN PHARMACEUTICAL ASSOCIATION (2) a formula for simple elixir was recommended in which oils of anise, caraway, cinnamon and fennel were the chief sources of flavor In 1872 Eberback (3) percolated fresh orange peel, powdered star anise, and cardamon with equal parts of alcohol and water To this percolate syrup, caramel and the proper amount of water were added Hancock (4) in 1873 reported that a most satisfactory simple elixir could be made from spirit of orange Markoe, at the same time, expressed a preference for the tincture made from the fresh orange peel Later Hancock (5) proposed a formula which contained spirit of orange and cinnamon water as the flavoring agents About the same time Remington (6) objected to the use of oils for making the elixir and suggested a formula composed of orange water, cologne spirit and syrup, with Spiritus Vini Gallici as optional for the preparation

In 1875 the Committee on Formulas for Elixirs of the AMERICAN PHARMACEUTICAL ASSOCIATION (7), reported a formula for simple elixir that contained spirits of orange and cinnamon Maddox (8), in 1880 suggested the use of oils of lemon, cassia and caraway, in a simple elixir which he considered superior to any he had used

The United States Pharmacopœia VI contained a formula for Elixir Aurantii (simple elixir) with oil of orange as the only flavor 'The New York and Brooklyn Formulary of Unofficial Preparations' (11) proposed a formula for Aromatic Elixir, in which Aromatic Spirit was the flavoring agent Aromatic spirit was an alcoholic solution of the extractive principles of fresh orange and lemon peel, bruised coriander and oil of star anise The same formula together with four others, was proposed in 'A Preliminary Draft of a National Formulary' (12) The second of these formulas was composed of solutions of the oils of orange, cinnamon, anise, bitter almond and tincture of cardamon The third contained only oil of orange and orange flower water The fourth contained the tinctures of fresh orange and lemon peel and orange flower water The fifth was made by percolating cinnamon, nutmeg, cassia, cloves, myrrh and aloe with the addition of a small amount of orange flower water

Elixir Aromaticum U S Pharmacopœia VII contained compound spirit of orange as the flavoring agent In 1896, Ott (14) suggested that the elixir should be made from the oils rather than from the compound spirit of orange McIntyre pointed out that the use of the compound spirit of orange was a means of assuring greater accuracy in measuring small quantities of the oils and that the spirit would keep better than the oils so far as flavor was concerned In 1902, Bradford (16) suggested the use of tincture of sweet orange Scoville (19), two years later, proposed a formula, which, he said corresponded to the official product in character and strength but was an improvement in vigor and delicacy He suggested the use of the tinctures of fresh orange and lemon peel, oil of coriander and white wine Johnson (25) however after considerable experimentation decided that the official formula containing compound spirit of orange could hardly be improved upon as a flavor In 1912 Egan (29) said that the aroma and flavor of the

official elixir could be greatly improved by dissolving the compound spirit of orange in the alcohol and allowing the solution to remain in a refrigerator for 48 hours The *Druggists Circular* (34) printed a formula in which soluble orange was used The editor pointed out, however, that such flavors were looked upon with suspicion Beringer (39) suggested the addition of 20 cc of oil of cinnamon to each liter of the compound spirit of orange for this elixir Jones (41) suggested the use of terpeneless oils of orange and lemon together with anethol and oil of coriander in a concentrated soluble formula, 30 cc of which, when properly diluted with alcohol, syrup and water, made a good simple elixir

THE ALCOHOL AND SUGAR CONTENT OF AROMATIC ELIXIR

Aromatic elixir seems to have been used as a vehicle for a number of years before there was much question as to its sugar and alcohol content In 1902, Bradford (16) suggested an improved formula in which glycerin represented 25% of the total volume and contained neither sugar nor syrup Fleet (20) later proposed a similar formula which he termed, Elixir Aurantii Sine Saccharum Heffner (22) in 1906, suggested that care should be exercised in using the official elixir as a vehicle in children's medicines because of its high alcoholic content and because of its incompatibility with certain salts Johnson (25) also considered the alcohol content too high and after some study of the problem recommended a formula containing about 6 5% by volume of alcohol Fantus (38) suggested that the alcohol content of this preparation should be adjustable to any desired strength He proposed a formula containing 5% alcohol, capable of further fortification with alcohol as occasions required Egan (40) proposed a formula containing about 8% alcohol and approximately 35% by volume of glycerin He gave as his reasons for these changes, the prohibition regulations and the scarcity of sugar He claimed that his formula made a product not only equal in quality to that of the official preparation, but that it was cheaper

In 1923 Snow and Fantus (42) found objection to the high alcohol content of simple elixir and proposed a formula for an aqueous elixir which contained 5% of alcohol and 20% by volume of glycerin, the latter replacing the alcohol of the official formula They maintained also, that their formula was a better solvent for salts that are often prescribed The *Druggists Circular* (43), in commenting upon non-alcoholic formulas for simple elixir, said that without alcohol it would be lacking one of its principal ingredients A formula suitable for diabetics was proposed by Snow and Fantus (45) in 1930 It contained gluside 20 Gm , glycerin 200 cc , alcohol 250 cc and water enough for 1000 cc This formula, it is suggested, is miscible in all proportions with alcohol and water The alcohol content may be reduced by diluting it, in which case it would serve as a vehicle for the bromides

CLARIFYING AGENTS AND METHODS OF MAKING AROMATIC ELIXIR

The most vexatious problem connected with the manufacture of simple elixir is that of clarification Elixir Aromaticum is widely used as a vehicle, and it is generally acceptable, but there is almost universal complaint as to the time consumed in filtering it For this reason many workers have suggested numerous ways of speeding up the filtration time for this preparation To accomplish this without seriously modifying the formula has proved to be no easy task

In 1873 Hancock (5) used paper pulp as the clarifying agent, saying that it was free from the chemical objections of magnesium carbonate and chalk Even though the finished elixir was turbid, it could be used for some purposes In 1880, Maddox (8) used magnesium carbonate to clarify what he called a superior formula Moore (9) also recommended the use of magnesium carbonate Simple elixir, U S Pharmacopœia VI was made by pouring a solution of alcohol, 1 part, and water, 3 parts, over cotton packed in a percolator which had been wetted with oil of orange The sugar was dissolved in the percolate and the product strained "The New York and Brooklyn Formulary of Unofficial Preparations" (11) contained a simple elixir formula which was clarified with phosphate of calcium In "A Preliminary Draft of a National Formulary" (12) five simple elixir formulas were proposed For one of these, calcium phosphate was the clarifying agent for another, carbonate of magnesia and for two others, talcum Elixir Aromaticum, U S Pharmacopœia VII was clarified by the use of calcium phosphate In 1896 Ott (14) used precipitated calcium phosphate in a proposed elixir formula Talcum appeared in the

formula for Elixir Aromaticum U S Pharmacopœia VIII, replacing calcium phosphate in the formula of the previous issue Parry (15) suggested a formula which, he said, needed no clarifying agent if allowed to stand two weeks before filtering Dunning (17) saved time in making this elixir by adding the calcium phosphate to the mixture of compound spirit of orange, alcohol and water, in which, after filtering, sugar was dissolved This avoided the tediousness of filtering a thick syrupy solution Caldwell (18), in 1903, reported that the preparation could be made to filter clear at once, if mixed in the proper manner Fleet (20) advised sprinkling the filter paper with calcium phosphate, before filtering, rather than mixing it with the liquids as is usually done According to Toplis (21), simple elixir is, "one of the greatest time consumers of the U S P" He modified the official process by mixing the compound spirit of orange with the talcum To this was added the solution of alcohol and water, which was filtered after the manner of making official waters The required amount of sugar was dissolved in this filtrate Posey (23) speeded the time of making even more by mixing the talc, the compound spirit of orange and the water and then filtering The syrup and alcohol were then added to the filtrate Doyle (24), in 1909, used magnesium carbonate as the clarifying agent The mixture was allowed to stand until a clear supernatant liquid separated which, it is stated, filtered clear in a short time

In 1910, the *Western Druggist* (27) printed a formula in which it was suggested that the alcohol be added in part to the compound spirit of orange, talc and water and the mixture filtered The remainder of the alcohol was added to the syrup, which in turn was dissolved in the clear filtrate Dunn (28), under the title of 'Shortcuts and Improvements," suggested that the compound spirit of orange and alcohol be mixed with kaolin and filtered, and that water be added to this filtrate, in which sugar was then dissolved, and the whole filtered through cotton Five grams of magnesium carbonate, according to Sass (30), gave better results in filtering than did the required amount of talcum In 1913, Daniel (31) modified the official process for simple elixir somewhat, but said, "It is my opinion that quick and easy, and first class work are incompatibilities" Possehl (32), in 1914, suggested that the official elixir could be improved by first making a water, in the usual way, from the compound spirit of orange and talc, and adding to it the syrup and alcohol Fried (33), in 1914, said, "one of the easiest preparations to make is aromatic elixir providing a few changes in procedure are made" He suggested that the syrup should be replaced by sugar and added after filtration and then the whole strained, if necessary Satz (35) filtered the aqueous-compound spirit of orange mixture with talc and to this added the syrup and alcohol Scher varied this a little He filtered the compound spirit of orange, alcohol and water mixture with talc and added the syrup to the filtrate Burge (36) followed Scher's procedure but used paper pulp as the clarifying medium Concerning aromatic elixir, Cook (37) said, "It is unfortunate that the purified talc which is not a satisfactory filtering medium, was not replaced by purified siliceous earth (Kieselguhr), which has been made official" Purified siliceous earth not only speeds the rate of filtering but clarifies the elixir promptly Egan (40) maintained that the use of purified siliceous earth, as compared to talc, resulted in clearer elixirs Jones (41) spoke out of much experience with simple elixir when he said, "Its clarification is very trying on one's patience, and the usual result is a cloudy preparation, even after many repeated filtrations" After a study of the effect of various clarifying agents upon "The Hydrogen-Ion Concentration of Aromatic Elixir," Krantz and Carr (44) concluded that normal magnesium carbonate is admirably suited for use as a filtering agent in this preparation, because it filtered rapidly and yielded an almost neutral elixir In 1930, Shiflett (46) offered a modified procedure quite similar to one reported in 1910 (27) A solution of 150 cc of alcohol and 300 cc of water is made The compound spirit of orange is then triturated with the talc and mixed with 350 cc of the above alcohol water solution After filtering, 375 cc of syrup are added to the filtrate To this is added the remaining 100 cc of alcohol, and then water enough for 1000 cc It is claimed that this process requires but one tenth the time of the official procedure 'If there is any discrimination in flavor, it is in favor of this non-official process' Silver (47) found fault with Shiflett's procedure and offered a slightly different one Burlage (48), in 1932, studied five methods for making simple elixir 1 The U S P method modified as to the order of mixing, 2 The U S P procedure unmodified, 3 Shiflett's Method, 4 Silver's Method, and 5 The U S P Method, modified by using double the specified amount of talc As to speed of filtration, he rated the methods of Shiflett and Silver about equal and superior to the present official and proposed modifications

Fantus, Dymewicz and Dymewicz (49), in 1933, criticized several methods and formulas, which have been proposed They formulated the three following rules for preparing the elixir 1 The viscosity must be kept low until after clarification 2 Filtration through talc and other absorbents must be abandoned, because it consumes time and wastes oil 3 One must avoid precipitating the oil globules so fine that they will pass through a filter paper and, in turn, a longer time for saturation should be allowed They propose making the elixir by mixing all of the water with the alcohol, adding the compound spirit of orange, and allowing it to stand for 24 hours being frequently agitated, then filtering through a hard filter, without the use of any absorbent Lastly dissolve the sugar in the filtrate

EXPERIMENTAL PART

In the face of the rather discouraging results of many workers, to speed up the time of filtration of Elixir Aromaticum without the loss of its very acceptable aroma and flavor, we attempted the impossible It was decided at the outset that the time consumed in filtering the official simple elixir is an item of no mean consideration Furthermore, it was assumed that it would be rational to sacrifice, if necessary, a part of the flavoring qualities of the present formula, for one slightly less pleasing, if the objections to the present process could be removed We have tried, in the work we have done, to incorporate the suggestions of other investigations, although not always in agreement with them upon every point

In an attempt to speed up the process for making aromatic elixir, a series of 14 elixirs were prepared The U S P X formula and procedure were used as a basis for the several modified formulas All deviations from the official formula and procedure are noted for each modification 1000-cc quantities were prepared in most cases

THE MODIFICATIONS

1 Elixir Aromaticum, U S P X The formula and procedure of the Pharmacopœia were used and followed and are not repeated here

2 Paper pulp was substituted for purified talc

3 Washed talc was substituted for the official talc This was prepared by washing the talc repeatedly with water by decantation for the purpose of removing all of the very fine filterable particles

4 The compound spirit of orange was mixed with the talc, to this was added, in portions, the syrup, alcohol and water previously mixed This was allowed to stand 24 hours and filtered in the usual way

5 Water and sugar were substituted for the syrup

The compound spirit of orange was dissolved in the alcohol, and water added in portions to make 818 cc This was mixed with the talc and filtered The sugar was dissolved in this filtrate and made up to 1000 cc by the addition of a solution of alcohol 1 and water 3 (This is the method of Toplis *q v* (21))

6 After the method of Scher, *q v* (35) the compound spirit of orange, alcohol and water were mixed with the talc and filtered as usual The syrup was added to the clear filtrate and the quantity made up to 1000 cc according to the official method

7 Glycerin, 125 cc , was substituted for an equivalent amount of syrup The compound spirit of orange, alcohol, water and talc were mixed and filtered, as officially directed The syrup and glycerin were added to the clear filtrate and the volume made up to 1000 cc as usual

8 An elixir was made by saturating the solvents The alcohol, syrup and water were carefully mixed Compound spirit of orange was then added dropwise, with shaking after each addition, until the solution became saturated

9 Number eight was repeated with a slight change in the solvent 125 cc of glycerin were used to replace an equivalent amount of syrup The alcohol, glycerin, syrup and water were then mixed Compound spirit of orange was then added as in number eight

10 An elixir was prepared according to the Shiflett formula (46) Dilute 150 cc alcohol and 300 cc of distilled water 350 cc of this solution were mixed with the mixture of talc and compound spirit of orange, and the whole filtered The filter was finally washed with the remaining 100 cc of alcohol and water solution Syrup was then added to this filtrate, in divided portions with agitation after each addition The remaining 100 cc of alcohol was then added and the volume made up with water, if the amount needed was small, with alcohol 1 part and water 3 parts, if the amount needed was large

11 Sugar and water were substituted for syrup The compound spirit of orange and talc were mixed 575 cc of water were added to this mixture and the whole agitated frequently for 15 minutes and then filtered in the usual way In 550 cc of the clear filtrate, 320 Gm of sugar were dissolved, 250 cc of alcohol then added and the volume made up to 1000 cc by addition of the first clear filtrate

12 The U S P simple elixir was prepared, using purified siliceous earth instead of the talc

13 The U S P simple elixir was prepared, using kaolin instead of the talc

14 The U S P simple elixir was prepared using magnesium carbonate instead of the talc

TABLE I

Formula No [1]	Appearance of Finished Product			Times Filtrate Was Returned Before It Cleared [2]	Rank as to Time Required to Prepare [3]	Condition after Two Years [4]		
	Clear	Cloudy	Colored			Odor	Taste	Sediment
1	cl			7	13	g	g	s
2	cl	f		22	14	g	g	s
3	cl			4	11	g	g	s
4	cl			5	12	g	g	s
5	2 w	1st		4	10	g	g	pro
6	2 w	1st		4	8	g	g	s
7	2 w	1st		4	9	g	g	pro
8		clo		nf	5	p	p	oil
9		clo		nf	6	p	p	oil
10	2 d	1st		3	7	t	t	s
11	cl			3	3	g	g	s
12	cl			1	4	g	g	
13	cl			2	2	g	g	
14	cl		sy	0	1	g	g	

ABBREVIATIONS cl, clear, 2 w, after 2 weeks 2 d after 2 days f faintly, 1st at first, clo cloudy, sy, slightly yellow, nf not filtered g, good, p, poor, t, terebinthinate, s, slight pro, pronounced, oil, oil on surface

[1] See preceding pages for formulas and methods of making

[2] Approximately 100-cc portions were returned each time

[3] Number one required the shortest time about an hour, and the longest time about 24 hours [4] Two years' time applies to Nos 1 to 11, about two months only to Nos 12 13 and 14

Table I gives, in brief, our observations of the fourteen modifications of the simple elixir made as outlined above They were observed (1) with respect to clearness and color, (2) the number of times that it was necessary to return 100-cc portions back through the filter before the filtrate became clear, (3) a comparative scale of the speed or time required to complete each product, and (4) condition as to odor, taste and sediment after standing in storage for two years

The results, as expressed in Table I, verify many of the observations of other workers upon this problem, as for instance the difference in filtering time with talc as compared to purified siliceous earth or magnesium carbonate

A SIMPLE ELIXIR OF LOW ALCOHOL CONTENT

We are cognizant of the objections that have been made to making a simple elixir by the so-called "aromatic water" method and also that it has been said that aromatic elixir with little or no alcohol in it is without one of its very important constituents Even so we chose to experiment with formula Number 11 which has been given Three lots were made by the "aromatic water" process These were termed Lots A, B and C and each contained successively smaller percentages of alcohol Lot A contained 15% alcohol, Lot B, 10% and Lot C, 5% These three lots kept perfectly for more than six weeks The only difference in taste that we could detect, was attributed by us to the alcoholic content We therefore concluded that a reasonably good aromatic elixir, with any desired alcohol strength, is possible

SIMPLE ELIXIRS AS OTHER ELIXIR VEHICLES

A Elixir Glycyrrhizæ U S P X—Since Elixir Glycyrrhizæ is a preparation composed chiefly of aromatic elixir, five lots of it were prepared using the modified formulas numbered 1, 11, 12, 13 and 14, previously described These five lots were observed over a period of several weeks They were, from all appearances, quite alike, even in the slight sedimentation that resulted

B Elixir Potassii Bromidi N F V—Approximately 30% Aromatic Elixir is contained in this preparation Three lots of it were prepared, using elixir modification formulas, numbering 1, 11, and a modification of number 11 containing but 10% alcohol described as Lot B in the paragraph under "A Simple Elixir of Low Alcoholic Content"

These three preparations were made according to the official directions They were studied over a period of several weeks No observable differences between them were noted during this time

These observations, though few in number, do indicate that some of the modified simple elixirs, which have been described, are usable and seem to compare well in that respect with the official elixir which is tedious to prepare and of questionable alcoholic content

A PROPOSED SIMPLE ELIXIR FORMULA

As a result of our study of the official simple elixir, especially with respect to

the difficulties of making, as well as to other objections that have been made, the following formula and method are suggested for the preparation of aromatic elixir

Compound spirit of orange	12 cc
Purified talc	30 Gm
Sugar	320 Gm
Alcohol	The desired amount
Distilled water, to make	1000 cc

Carefully mix the compound spirit of orange and talc by trituration Add about 800 cc of water, in convenient portions, and triturate after each addition Agitate frequently for about 15 minutes and filter in the usual manner Dissolve the sugar in 550 cc of the clear filtrate and to it add the amount of alcohol desired *Finally make up to 1000 cc with the required amount of* the clear filtrate

CONCLUSIONS

Although this recommended formula may contain somewhat less of the flavoring principles than does the official elixir, we think it is sufficiently strong in flavor to serve as a good vehicle We recommend it for the following reasons

1 The time required to prepare it is approximately one-tenth that necessary for the present official simple elixir

2 The alcohol strength of this elixir may be varied at will without modifying the technique of making

3 The preparation is always the same clear product regardless of a variation in the alcoholic content

REFERENCES

(1) Newark Pharmaceutical Association, *Am J Pharm*, 43 (1871), 310
(2) Report, Committee on Unofficial Formulas, PROC A PH A, 19 (1871), 350
(3) Eberback, PROC A PH A, 20 (1872), 271
(4) and (5) Hancock, *Ibid* 21 (1873), 91, 119
(6) Remington, *Am J Pharm*, 45 (1873), 533
(7) Report, Committee on Formulas for Elixirs, PROC A PH A, 23 (1875) 489
(8) Maddox, *Drugg Circ*, 24 (1880), 204
(9) Moore, *Ibid*, 25 (1881), 2
(10) Rother, *Am J Pharm*, 57 (1885), 479
(11) "New York and Brooklyn Formulary of Unofficial Preparations," PROC A PH A, 33 (1885), 600
(12) Preliminary Draft of a National Formulary PROC A PH A, 34 (1886), 195
(13) "British Pharmacopœia Codex," Formula, Yr Bk Pharm (1887), 586
(14) Ott, PROC A PH A, 44 (1896), 407
(15) Parry, *West Drugg* 24 (1902) 8
(16) Bradford, PROC A PH A, 50 (1902), 709
(17) Dunning *Drugg Circ*, 48 (1904), 29
(18) Caldwell, *So Drug J*, 2 (1903) 186
(19) Scoville, *Am J Pharm*, 76 (1904), 158
(20) Fleet *Canad Pharm J* through *Pharm Era*, 33 (1905), 577
(21) Tophs, *Am J Pharm*, 78 (1906) 332
(22) Heffner, "Proc Penn Pharm Assn" (1906), 77
(23) Posey, *Pharm Era*, 40 (1908) 757
(24) Doyle *Drugg Circ*, 53 (1909) 297
(25) Johnson, *Pharm Era* 41 (1909), 469
(26) Under Queries *Am Drugg*, 54 (1909) 333
(27) Under suggestions for the U S P *West Drugg*, 32 (1910), 621
(28) Dunn, *Drugg Circ*, 55 (1911), 690
(29) Egan, *Bull Pharm* 26 (1912), 39

(30) Sass, JOUR A PH A , 1 (1912) 1251
(31) Daniel *Drugg Circ* , 31 (Dec 1913), 39
(32) Possehl *Ibid* 58 (1914) 11
(33) Fried, *Ibid* 58 (1914), 24
(34) Improved Recipes *Ibid* 58 (1914), 150
(35) Satz *Pract Drugg* , 35 (Jan 1917), 36
(36) Burge *Ibid* , 35 (March 1917) 21
(37) Cook JOUR A PH A , 6 (1917) 75
(38) Fantus *Ibid* , 9 (1920) 708
(39) Beringer Proc N J Pharm Assn " 50 (1920), 37
(40) Egan *U S P X Circ Gen Com* 1 (1920), 113
(41) Jones JOUR A PH A , 11 (1922), 277
(42) Snow and Fantus *Ibid* 12 (1923), 143
(43) Non Alcoholic Simple Elixir *Drugg Circ* , 74 (July 1930), 30
(44) Krantz and Carr, JOUR A PH A 19 (1930), 1095
(45) Snow and Fantus *Ibid* , 19 (1930), 1007
(46) Shiflett *Pract Drugg* , 48 (March 1930) 17
(47) Silver, *Ibid* 48 (Apr 1930) 37
(48) Burlage *Pract Drugg* 50 (Oct 1932), 16
(49) Fantus Dymiewicz and Dymiewicz JOUR A PH A , 22 (1933), 655

PURDUE UNIVERSITY SCHOOL OF PHARMACY
LAFAYETTE INDIANA

C LEWIS DIEHL *

BY JOHN E KRAMER

The name Diehl is synonymous with pharmacy, pioneer and progress C Lewis Diehl's connection with the first is well known to every one acquainted with the history of American pharmacy This profession was evidently his very life and being, as attested to by his career

That he was a pioneer can be seen in a cross section of his advancement through life Less than fifty years after the Philadelphia College of Pharmacy had been founded in 1821, Mr Diehl was the founder of the Louisville College of Pharmacy in Louisville, Ky , and was elected and reelected, successively, president of that institution for eleven years He proved to be a pioneer as one of the members of the first Board of Pharmacy of Kentucky, retaining that post for twelve years He opened two drug stores in Louisville, and was one of the pioneers in research work along pharmaceutical lines, being noted for his work on percolation, along with Procter, Squibb and others of his time Incidentally, this process of extracting the principals of drugs by percolation, developed in America, remained a typical American process, as the European countries never became enthusiastic over the idea, and almost totally ignored it

Pharmacy, in the time of Diehl, was in an early stage of organization in the south and southwest, and also in the matter of research and the establishing of American pharmaceutical customs Prof Diehl was indeed a leader of the pioneers in these fields

The third synonym is progress Something once started must be continued, to make it worth while Professor Diehl applied this idea to pharmacy, for, after

* Section on Historical Pharmacy, A PH A , Madison meeting, 1933

establishing the College and the State Board, he continued to serve with them, in some capacity, until his death His connections with the local and national pharmaceutical associations were not stationary, but progressive As the Reporter on the Progress of Pharmacy for the AMERICAN PHARMACEUTICAL ASSOCIATION, Diehl's reports were pieces of masterful, scientific work In the year in which he was president of this organization, 1874, his report filled 278 printed pages and comprised the greater bulk of the YEAR BOOK Reports of this great length and scope were customary to the man As one member stated, his reports alone were worth the yearly dues

Professor Diehl was also associated with the revision committees of the United States Pharmacopœia and the National Formulary, doing his greatest work with the N F committee as chairman of that body His connections with both these books of pharmaceutical standards helped in the great work of revision by preventing duplication of formulas and contents Again progress was his watchword

A short sketch of Prof Diehl s life shows his continued work for pharmacy He was born in 1840 in Bavaria, and at the age of eleven came to America, immediately entering a school near St Louis Three years later he left the school and came to Philadelphia to be with his father His first job was with a perfumer and drug sundryman, but soon after became apprenticed to a pharmacist-physician While serving his apprenticeship he attended the Philadelphia College of Pharmacy and graduated in 1862 After service in another drug store he entered the employ of John Wyeth and Brother

The Civil War then became the foremost topic and action of the day and Diehl answered the call to arms, serving in the 15th Pennsylvania Regiment until he was severely wounded at the battle of Stone River, from which wound he never fully recovered Until the close of the war he served the Government as a chemist, and then went to Louisville to become manager of the Louisville Chemical Works

It was in that city that he did his pioneer work of establishing his stores, the College and the State Board, and served as president of the Kentucky Pharmaceutical Association From there, too, he conducted all his activities with the various committees of national scope, and in that city he died, in 1917

Professor Diehl was a constant contributor to journals and conducted many scientific researches His reports were masterpieces of science, well balanced and constructive In recognition of his work he received the honorary degree of Master of Pharmacy from the Philadelphia College of Pharmacy and Science, in 1887

Friendship and respect he won, his passing brought forth many sincere expressions of sorrow from men of foremost importance in all walks of life There was not so much of the romance about Professor Diehl as with others of his and earlier times Simplicity and earnestness marked his endeavors for pharmacy and his only ambition was the furtherance of his beloved profession

REFERENCES

First Century of the Philadelphia College of Pharmacy and Science ' JOUR A PH A 6 (1917), 580

LaWall's ' Four Thousand Years of Pharmacy '

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note Do colleges of pharmacy give sufficient work in pharmacology? I believe I agree with Dean Serles that they do not and that, with the extension of the course to four years, this should be corrected However, the cost of a laboratory course in pharmacology to a large group of students may be expensive unless great care is taken to keep the expenses down Demonstration by the instructor of the pharmacological reactions that "run into money" will be helpful but a course that consists entirely of such demonstrations will not suffice Dean Serles has presented a sane view of the problem and has given suggestions that will be helpful to any college contemplating such a course —C B JORDAN, *Editor*

OUR FOUR YEARS' EXPERIENCE WITH THE TEACHING OF PHARMACOLOGY AT SOUTH DAKOTA STATE COLLEGE

BY E R SERLES *

The advent of the four-year course as a minimum requirement for graduation from member colleges of this association has brought forth a divergence of opinion as to what subject material, new or old, should properly receive further development The Syllabus published in the latter part of 1932 has projected an outline of the old and some new courses, which although not obligatory, will undoubtedly influence many of the schools and colleges in reshaping their curricula Perhaps the most radical departure from the old order advocated by the Syllabus Committee was the dropping of the term Materia Medica and the inclusion of the term Pharmacology in lieu thereof

Pharmacology is not a new science It is not new to Pharmacy for our leading pharmaceutical houses have been employing a knowledge of its fundamental principles in drug standardization for many years

The teaching of this science in colleges of pharmacy is, however, new A survey of our college catalogs of a few years ago fails to show more than one or two schools engaged in the teaching of any phase of pharmacology except posology and toxicology and in most cases such courses were wholly didactic

Realizing the value of laboratory demonstration in the teaching of chemistry, pharmacy and dispensing, we of the faculty of State College conceived the idea that the teaching of dosage and related functions of drugs could be more easily accomplished if we could but show the effects of a single drug or a group of drugs upon living organisms

Perusal of medical college catalogs and laboratory outlines of courses in pharmacology offered in such schools, together with experience gained in the chemical war service clearly indicated that a course in pharmacology for pharmacy students was feasible and, what was more important, desirable

Pharmacology was accordingly offered as an advanced elective to those students who had completed courses in physiology, pharmacognosy, materia medica and chemistry The ease with which they adjusted themselves to the complicated laboratory procedure of taking a blood pressure, giving anesthetics, hypodermic and

* South Dakota State College

intravenous injections proved to us that here was a means of fixing the facts covering drug action and dosage long overlooked in our methods of teaching this important part of a pharmacist training

Dr M R Thompson in a paper before this group emphasized the adaptation of pharmacologic procedure to bioassays as being the phase of pharmacology which should receive our attention when trying to build a course for pharmacy students This may be true, but it has been my experience, and particularly so as a member of the U S P Bio-assay Committee, that this part of the work is highly specialized, and requires the best of apparatus, controlled conditions and a profound knowledge of the fundamentals of pharmacology, if more than just the technique of the experiment is to be demonstrated

Again we must keep in mind that if we are to drop the subject hitherto known as Materia Medica, and put in its place Pharmacology, we must provide some means of conveying to the student a knowledge of that vast wealth of information concerning the origin, composition and properties of remedial agents Such information, I believe, should be included in the courses of pharmacognosy, if the material is of a crude drug nature and in the courses of pharmacy if the substance be a chemical

For the past four years we have been shaping our courses with this end in view Pioneering in this field we have made mistakes, but most of them have been on the side of omission rather than commission

First, we found our students lacking in a knowledge of physiology and comparative anatomy, especially of the smaller animals used in experimental work *Second*, the ability to interpret physical phenomena, such as rate of injection, kinds of material injected and site of injection were problems for both the operator and student to master *Third*, organization of laboratory experiments, so that the cost of operation is not too great is necessary for one must recognize that pharmacology properly taught is expensive The source and care of laboratory animals is the chief factor in determining the cost of the course once the laboratory is equipped

The course as it has been given has been chiefly for advanced students, where the numbers were few, consisting of two lectures per week and two three-hour laboratory periods I should like to emphasize the fact that the laboratory periods should be at least three hours in length and could well be extended to a full half day for the more extensive animal experiments

Our new course designed to include the students who are to receive a general training for the practice of retail pharmacy will consist of three lectures per week on the theory of drug action and a single laboratory period, chiefly demonstration

In this connection I assume that you will be most interested in the laboratory procedures For convenience we have divided these into two groups

Chemical Experiments		*Excretion of Drugs*
Important reactions of	Methanamine	Phosphate, etc , in the urine
	Formaldehyde	Iodine in the saliva
	Alcohols	Physical chemistry of soaps and emulsions
	Phenols	Action of indicators, U S P , etc
	Salicylates	Buffer value of phosphates

Antiseptics
Phenol co efficient, etc
Common uses
Astringents
Effects on tissues
Effects of acids and alkalies
On protein
On mucous membrane
Preparation of colloidal solution gels
Importance in drug action

Physiological Experiments

Irritants and demulcents
On skin and mucous membrane
Local anesthesia on a frog
Local anesthesia on a man
Administration of anesthetics (rabbit)
Ether
Chloroform
Chloral hydrate
Magnesium sulphate
Effects of (rabbit)
Morphine
Chloroform
Chloral hydrate
Magnesium sulphate
Action of (frog, guinea pig and cat)
Digitalis
Atropine
Pilocarpine
Effect of drugs on circulation (dog or rabbit)
Demonstration
Effects of drugs on G I tract (rabbit)
Demonstration

This course will be given throughout the senior year and will be supported by the courses in Dispensing The course as originally given will be continued for graduate study

I am certain that the work which we have been giving during the past four years has enabled our students to have a better understanding of the whole field of therapeutics It has impressed upon them the need for care in preparing sterile solutions for hypodermic injections, intravenous use of glucose, and an accurate physiological salt solution

They know why a doctor prescribes an Eggleston dose of digitalis, because they have seen its action in an animal They understand the normal functions of the human body better, and are, therefore, entitled to be considered by the physician as an indispensable aide in his service to the patient

---

THE INTER-RELATION OF THE DEPARTMENTS OF PHARMACOGNOSY, PHARMACOLOGY AND CHEMISTRY

Editor's Note Education should not come in separate packages" wrapped and labeled chemistry pharmacy pharmacology etc , because all of these subjects are inter dependent and should dovetail with each other This dovetailing cannot be successfully done without an effort on the part of the instructors Professor Christensen points the way for such cooperative efforts —C B JORDAN

BY B V CHRISTENSEN *

Inasmuch as this paper is to be presented before a group of teachers of chemistry it is presumed that you will be interested in a few suggestions pertaining to the chemical training of students deemed desirable by teachers of pharmacognosy and pharmacology The suggestions offered herewith relate more particularly to the nature rather than the scope of chemical knowledge which teachers of pharmacognosy and pharmacology consider essential as aids to a proper understanding and appreciation of these subjects by students As a matter of fact, if you would

* Professor of Pharmacognosy and Pharmacology, School of Pharmacy, University of Florida

permit a criticism, I would say that your weakness lies in quality rather than quantity However, inasmuch as the writer is not a chemist, this discussion is not to be considered a critical review of the teaching of chemistry It is intended only to offer a few suggestions as to the nature of the chemical knowledge which is of particular value to students in acquiring an understanding and appreciation of the subject matter of pharmacognosy and pharmacology No attempt is made herewith to classify chemistry under its various subdivisions such as inorganic, organic, physical, etc , and especially in view of the fact that some of the suggestions offered might apply to all or any one of the various subdivisions

INTERPRETATION OF CHEMICAL LANGUAGE

First and foremost, we should like to have students well trained in the reading of and interpretation of chemical language A chemical equation, for instance, is a statement of a chemical fact or theory As a matter of fact, in many cases a chemical equation is a paragraph or a page of information to those who know how to read and interpret Take, for instance, the simple equation, $NaOH + HCl = NaCl + H_2O$ If this is true, it tells us that one molecule of sodium hydroxide will combine with one molecule of hydrochloric acid to form one molecule of salt and one molecule of water It also tells us that 40 Gm of sodium hydroxide will combine with 36 5 Gm of hydrochloric acid to form 58 5 Gm of salt and 18 Gm of water We might use Mg or pounds or tons in the same proportion Again it may tell us that the valence of chlorine is one, of oxygen two, of sodium one and so on This is simple, of course, but illustrates the point in mind

A chemical formula also should convey considerable information to a student From it he should be able to classify the compound as an alcohol, aldehyde, alkaloid or whatever it may be He should also be able to predict stability and reactivity and, the nature of compounds formed as a result of the reaction, *i e*, he should be able to predict polymerization, addition or substitution He should be able to predict at what point the reaction might occur and thus suggest possible new compounds and the nature of such as for instance, the barbiturates

We expect students to know at least the elementary principles of nomenclature so that they will recognize the same substances under different chemical names and so that from a given formula they may derive a correct chemical name This also applies to ide, ate, ite, ic and us endings We expect also that students know enough about isomerism to appreciate why it is that two substances may have the same empirical formula and yet differ as to physical properties and physiological action

From the above viewpoint we might compare chemistry to a new language, and proficiency in chemistry, therefore, depends to a large extent upon the quality and scope of the chemical vocabulary of the student

NATURE OF SUBSTANCES

Second, we should like to have students come to us well informed as to the nature of substances They should appreciate thoroughly that substances are recognized and differentiated by means of their properties, both physical and chemical Students should have clear and definite knowledge as to the meaning and significance of specific gravity, melting point, boiling point, solubility, optical rotation,

refraction, etc When he is told that the specific gravity of a substance is 2 3 at 4° C , he should be able to determine the weight of a given volume of that sub stance When given weight and volume, he should be able to determine specific gravity and when given specific gravity and weight he should be able to determine volume We expect students to know the nature of such substances as fats, fixed oils, carbohydrates, glucosides and gums I mention these particularly for the reason that in my experience these have offered the greatest difficulties It is not enough for students to know that fixed oils are made up fundamentally of glycer-ides of fatty acids but they should know the nature of the more common glycerides such as olein, linolein, palmitin, etc Are these glycerides liquids or solids, how do they differ as to consistency, melting point, color and other pertinent properties? If the students know the nature of the more common glycerides, they have less difficulty in understanding and appreciating why we have several fats and fixed oils official and how they differ from each other

With respect to the nature of substances, qualitative tests should not be over looked Students should be trained in the use and application of such tests in recognition and differentiation of substances Finally, we expect students to be able to make quantitative determinations both gravimetric and volumetric and, in this connection, we suggest that students not only be carefully instructed but drilled on the meaning of the various terms used in connection with volumetric solutions, such as normal, tenth-normal, half-normal, etc , and considerable prac-tice be required in preparing and standardizing such solutions

PROCESSES

Third and last, we expect students to have a knowledge of processes For instance, students should be proficient in performance of the various processes used in determining specific gravity for the several types of substances such as those insoluble in and heavier than water, insoluble in and lighter than water, substances soluble in water and for which some other liquid must be used, liquids, powdered or granular substances and so on We expect them to know how to determine melting point, boiling point, optical rotation and solubility Again, students should be able to purify substances by crystallization or sublimation or fractional distillation or by selected solvents They should understand the differences be tween direct steam distillation, indirect steam distillation, destructive distillation, fractional distillation, distillation under reduced pressure and the principles under-lying each process

In closing allow me to state that I appreciate the fact that you are not teaching your students fundamentally for the purpose of preparing them for pharmacognosy and pharmacology However, it does appear that you are training your students for future needs, some of which occur during their college life Hence, if the stu-dents need the foundation in chemistry outlined above, it seems logical that their courses in chemistry should include such instruction both as to character and scope of information Let me remind you again, that as far as pharmacognosy and pharmacology are concerned, it is desirable to emphasize quality rather than quan tity of chemical information

---

Eighty-second annual meeting of AMERICAN PHARMACEUTICAL ASSOCIATION and dedication of the American Institute of Pharmacy during week of May 7th See Transportation under department "Societies and Colleges "

THE CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

MINUTES OF THE SESSIONS HELD IN HOTEL LORAINE, MADISON, WIS., AUGUST 31 AND SEPTEMBER 1, 1933

The fifth annual meeting of the Conference of Pharmaceutical Law Enforcement Officials was convened by Chairman R. L. Swain, at 9:00 A.M. in the Colonial Room, with the following present: Messrs. H. H. Schaefer and F. C. A. Schaefer, of New York, Pierce, of Maine, McShane, of Vermont, Jones, of South Dakota; Childs, Milne, King and Reese, of Kansas, Hayman, of West Virginia, Bingham, of Alabama, Meads, Teeters, Slocum, Judisch, of Iowa, Hankins, of Florida, Costello of North Dakota, Henry, Durham, of Michigan, Fischelis of New Jersey, Nye, of Missouri, Monias and Christensen of Illinois, Netz, Bender of Minnesota, Wilson, of Georgia, McCullough, Russell, of Indiana, Wilcox, of Pennsylvania, Philip, California, Jelinek, of Minnesota, Kremers, of Wisconsin, Kelly, Eberle and Swain, of Maryland, Ford, of Ohio.

Chairman Swain delivered his address and upon motion duly seconded, same was received for publication.

THE CHAIRMAN'S ADDRESS

BY R. L. SWAIN

In presenting this address to the Conference of Pharmaceutical Law Enforcement Officials, I shall endeavor to establish one or two general propositions to which I think we should devote our earnest thought. First of all I think it is our responsibility to point out the defects existing in the pharmacy laws, and to take the lead in having these defects corrected. Secondly, we should do all that we can in our official capacity, to acquaint the public with the basic significance of pharmacy to public health. I couple these two thoughts together because I am not able to see any way of correcting the defects in pharmaceutical legislation unless our efforts are based upon the public function which pharmacy renders. The whole field of drugs and medicines is so closely connected with the public welfare that pharmaceutical legislation should seek to lodge its regulation and control with the pharmaceutical profession. I have no difficulty in feeling that proper and adequate pharmaceutical legislation is a logical and certain outcome of a due regard, on the part of the public, of the work which pharmacy does.

Assuming that these propositions are sound and I doubt that any will contend against them, then it seems to me that enforcement agencies should carefully study existing laws, with the view of evaluating their effects upon the community.

Legislation, restricting the practice of pharmacy and the distribution of drugs and medicines to persons meeting lawfully established standards of education and experience, has long been a part of the public general laws of every state. The constitutionality of this legislation is no longer open to question. It is well established that such restrictive regulation and control is a proper exercise of the police power of the states. The police power of a state is the inherent sovereign authority under which its legislature may, within constitutional limits, prescribe the laws and regulations to safeguard the safety, health and morals of the people, prevent fraud and oppression, and promote the public convenience, prosperity and general welfare.

The purpose of these laws is to surround the distribution of drugs and medicines with certain definite legal precautions. Competency and skill are required of those seeking to engage in this important activity.

However, a casual study of the pharmacy laws discloses some major defects. While they do set up generally satisfactory standards for purely professional pharmaceutical practice, all of them recognize certain exceptions and exemptions which go far to defeat their public purpose. As a very general rule, pharmacy laws permit the free and unlimited sale of patent and proprietary medicines and the commonly used household or domestic remedies. True, the language varies, but the meaning and import are the same. This condition is far from new. It seems to have been coexistent with pharmaceutical legislation in this country. The first pharmacy law enacted in this

country was, so far as I have been able to learn passed in South Carolina in 1817 Among its interesting provisions, was one stating that it should not apply to the sale of home made remedies and such as were obtained from manufacturers in shape for lay use From that early day, no pharmacy law has been passed without making liberal exceptions in behalf of patent and proprie tary medicines

It should be admitted, I think that there was once some valid basis for the exceptions Drug stores were not as easily accessible as they are now, and hence, general dealers were permitted to handle drugs and medicines Transportation and the lack of the modern means of communica tion also had to be taken into consideration when legislation of this type was being considered Also the pharmacist or druggist was not accepted as an educated man In those early days, he was a merchant carrying drugs and medicines as a side line As a logical result drugs and medicines were looked upon simply as articles of merchandise, and as such, could be handled with out restriction or control This view finds recognition in early court decisions, in which all at tempts at restriction were set aside Being mere articles of merchandise, no reason was acceptable to justify permitting their sale by some and prohibiting it to others Under the light of changed conditions we may well question the wisdom of perpetuating the old points of view For instance good roads telephones, automobiles have annihilated distance and the drug store is, in most sections of this country, convenient to the people Also, the pharmacist is now a man of college and university training and well qualified to serve the public in a professional capacity and to advise in the use of drugs and medicines Also, such salutary legislation as the Food and Drugs Acts has done much to drive the merchandise conception out of medicine and to reserve the field for such preparations as are reasonably safe Drugs and medicines are more and more becoming health adjuncts and thus perhaps more definitely belonging in the hands of persons of training and experience The final report of the Committee on the Costs of Medical Care has focused attention upon medical problems and has made the specific recommendation that the standardization preparation and distribution of drugs and medicines be restricted to pharmacists in so far as this is possible and practicable

It would be possible to record other changes which have come about, and to show that the old bases of the exceptions no longer exist However, perhaps the most significant development in the whole matter and the one deserving of the most careful study at our hands, has been in the nature of the products which may be defined as proprietary I think it can be said that the early use of the terms patent and proprietary medicines was in keeping with the general accepted meaning of the terms While the words were "patent and proprietary medicines " the phrase had no implications beyond the usual patent medicine The word "proprietary " was synonymous with and descriptive of the word, patent " Thus a proprietary medicine was no more than a patent medicine That the conditions have changed is quite obvious There has long been a marked drift away from manufacturing in drug stores, and to a concentration of production in the large pharmaceutical manufacturing plants Concurrent with this change has come about the pharmaceutical specialty under special trade marked names Many complex and potent prepara tions can be obtained under short and easily remembered names The great research laboratories of the pharmaceutical and chemical plants are turning out a continuous and ever-growing list of special preparations, the property rights to which are owned by the companies themselves The chemo therapy age which now exists, is bending its every energy to the production of specialties for the treatment of disease In most cases, these products are complex potent, frequently dangerous and are invariably obtainable under short trade names While these products vary tremendously in their nature, use toxicity and adaptability to disease they are all alike in that they are proprietary products " Some concern has a property or proprietary right to the patent under which they are produced and to the name and package in which they are sold Thus, in an important sense as soon as the most dangerous research product becomes available to the public it also comes to the public as a 'proprietary" product or medicine There may be little general knowledge regarding it the medical profession may consider it as in the experimental stage, the public may be totally unacquainted with it, and yet under the pharmacy laws them selves, enacted in the public interest such products may be handled and sold by anyone irrespec tive of skill and training In other words, the exceptions in the pharmacy laws still make it possible for the most dangerous products to be distributed to the public as merchandise

To show the absurdity of the present conditions, it can be said that in one state camphor

ated oil may be sold only by a registered pharmacist, while veronal, barbital, amytal and many others may be sold by anyone In most states no distinction is practiced and patent and proprietary products and the usual domestic remedies are freely available from any and all kinds of retail dealers The mere fact that the evident and obvious legislative intent was to permit free sale of patent medicines and the commonly used household remedies has not prevented dangerous proprietary preparations from being just as freely sold and distributed

It must be apparent to all that such a condition is certainly not in the public interest In fact, it seems greatly inconsistent with the main purpose of all pharmaceutical legislation

As I see the matter, our whole system of pharmacy laws should be carefully studied Many of the provisions should be entirely rewritten An intelligent and earnest effort should be made to make them more stringent, and thus more effective The broad general exceptions in favor of general merchants should be removed and reconsidered in the light of prevailing needs and prevailing conditions

I urge, as a beginning that the Conference approve the appointment of a committee to carefully study the significance of the terms ' proprietary preparations ' and patent medicines " so that these may be defined in the light of present scientific knowledge, and with due regard to the demands of public health

Upon motion of Mr Childs seconded by Mr Milne a motion was adopted that the incoming chairman appoint a committee to draft a suitable definition for patent and proprietary medicines

Secretary and Treasurer M N Ford, of Ohio, presented his report as follows

THE REPORT OF THE SECRETARY-TREASURER

BY M N FORD

Since the last annual meeting of the Conference of Pharmaceutical Law Enforcement Officials, your chairman, Mr Swain and the secretary, have had numerous requests for information regarding enforcement of pharmaceutical laws and to each request we have lent all possible aid

On December 17, 1932, upon the request of Chairman Swain we sent a letter to each Secretary of every State Board of Pharmacy as well as other departments having to do with pharmaceutical law enforcement, with regard to the sale of drugs and medicines by vending or slot machines From the response that we had, it seems the letter was very timely in that a number of states have sought opinions and amendments to the law that would bar the distribution of drugs and medicines through vending machines

On January 31 1933 Chairman Swain also directed me to send a letter to all State Boards of Pharmacy, as well as other state departments having to do with pharmaceutical law enforcement the letter dealing with amending the pharmacy laws to use the term packaged medicines" in preference to the term ' patent or proprietary medicines ' The fact that the exemption clause of the law permitting the sale of patent or proprietary medicines by general dealers is sufficiently broad we should exert every energy to see that the law is not changed to grant further exceptions

We received numerous acknowledgments of receipt of this letter and assurance that no such legislation proposed would be sanctioned by enforcement officials

The report of our last annual conference as you know, appeared in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION in the December issue and contained thirty one pages of printed matter, and on February 17th, we obtained 300 reprints of the proceedings which were mailed out as first class mail, to the members of the Boards of Pharmacy as well as others interested in pharmaceutical law enforcement

On February 21st we wrote to all the secretaries of the State Boards of Pharmacy, as well as other pharmaceutical law enforcement officials regarding the annual five dollar contribution to the Conference This request was followed up by a letter on June 8th, and up to this time the following 25 states have contributed the usual five dollar fee I list the states in the order in which the fees were received

Ohio Indiana North Dakota, Kentucky Colorado, New Jersey Iowa, Georgia West Virginia New York Alabama Maryland Pennsylvania Arkansas Michigan Delaware New Mexico, Kansas Vermont Oregon, Florida Idaho South Dakota Minnesota and Wisconsin

In addition to those already contributing we have had acknowledgments from some of the States stating their contributions would follow a little later on

FINANCES

Receipts

Balance on Hand		$243 94
Receipts from 25 states at $5 00 each		125 00
		$368 94

Disbursements

12/29/32 to L A Engel, letter heads and reprints	$ 7 50	
2/17/33 Postage for Secretary's office	50 00	
3/18/33 to JOURNAL A PH A printing proceedings	115 77	
8/15/33 to Dr R P Fischelis for work on Synonyms report	25 00	
Total Disbursements	$198 27	
Total Cash Balance		$170 67

Upon motion of Mr Milne seconded by Mr Costello, the report was approved

Upon motion of Mr Childs, seconded by Mr F C A Schaefer, the Chairman was to appoint a Finance Committee of five to provide for the finances of the Conference in the future

At this time the Chairman called upon Secretary Kelly of the AMERICAN PHARMACEUTICAL ASSOCIATION and his remarks concerning the Conference were very encouraging and greatly appreciated

Chairman Swain next called upon Walter F Meads of Iowa for a paper upon "The Value of Annual Renewal of Pharmacists' Certificates in the Enforcement of Pharmacy Laws" The paper was received and discussed by Messrs Fischelis Pierce, Henry, Hankins and Swain

THE VALUE OF ANNUAL RENEWAL OF PHARMACISTS' CERTIFICATES IN THE ENFORCEMENT OF PHARMACY LAWS

BY WALTER F MEADS

In presenting this paper at this session of the Conference of Law Enforcement Officials I will attempt to show you the analogy between the annual renewal of the pharmacists' license and law enforcement How in the State of Iowa with whose workings I am most familiar, the enforcing of laws governing the practice of pharmacy is dependent on, or closely allied to the renewal of certificates

In 1880 the first pharmacy law was enacted in Iowa It provided regulations for the sale and distribution of drugs and medicines, as well as for the establishment of a commission of pharmacy, which was given authority to administer the affairs of the profession This included the enforcement of the laws governing the practice of pharmacy and the licensing of pharmacists by examination

In order to place the profession and the distribution of drugs and poisons under State regulation, with its added protection to the druggists and to public health, it was agreed by the pharmacists that the expenses of the department and of the law enforcement would be paid through the collection of license fees and the annual renewal of certificates That this was a wise agreement can be shown by the benefits accruing from the annual renewal of certificates

The greatest value of the annual renewal is perhaps that it provides funds for law enforcement which might be obtained if the Board was dependent entirely upon funds raised by a general taxation While it is true that the money we collect is paid into the State Treasury and an appropriation must be made by the legislature for our expenses, the fact that the Board is more than self sustaining is a valuable argument when requesting funds for the operation of the department This has also been a valuable argument, when on several occasions the pharmacy board has been faced with consolidation The fees are largely responsible, I believe for the fact that we have always been independent and have held the administration and enforcement of the pharmacy laws in the hands of members of the profession, the value of this independence can be appreciated by all of us here

It was the provision of the annual renewal and its ensuing independence that placed the

pharmacists in Iowa in the position of being able to secure in 1885, a law governing Itinerant Vendors of Medicine, requiring an annual license fee This law is still in effect and enforced by the Iowa Pharmacy Board We have been very fortunate in retaining the administration of this law, for such regulations are best enforced by those who are directly interested We have not only given our own druggists protection from this type of competition, but have added considerable to our prestige, by turning back to the State General Fund the sum of $20,000 to $40,000 a year Over the period of years the grand total above expenses is something over $900,000

The annual renewal of certificates is of assistance to us in law enforcement, in that the information requested on the renewal application blank gives us a record of the pharmacist which can be obtained otherwise only by personal contact This application when returned with the fee for renewal, gives the location of the pharmacist, whether active in retail drug business or not, and if active whether it be as proprietor manager or clerk, as well as the name of the firm where he is practicing Some states have sufficient inspectors to call in all stores several times a year, but we are not so fortunate in this respect Through our renewal we check by mail as it were, the things an inspector would learn through a visit to the store as our files are our check when any violations are reported relative to the supervision of licensed pharmacists in drug stores It is our policy as a rule, to send out each year with the renewal receipts, notices of changes in laws, reports or request for cooperation along the line of law enforcement This has brought big returns in interest and a closer contact with the druggists over the state Through this closer touch, they feel that the work of the Pharmacy Board including law enforcement, is part of their own personal responsibility Other states can and do send out material of this nature, but the renewal is an easy and natural way to handle this type of work which is one of the duties of the Pharmacy Board

In the inspection of drug stores the work is facilitated by renewal receipt card, which in Iowa must be on display along with the original license The inspector can tell at a glance whether the certificate is in good standing and if not a check is made to ascertain whether the owner is active in the store, or the reason for failure to renew the license

I hope I have successfully pointed out to you why we in Iowa feel that the annual renewal of certificates is of considerable value in the enforcement of the laws coming within the jurisdiction of the Pharmacy Board To sum up *first*, because it brings in funds not raised by general taxation, with which to best administer the pharmacy laws in the interest of public health and the profession *Second* because through annual renewals it is possible to keep in closer contact with the pharmacists, thus we have the opportunity to give as well as receive information relative to law enforcement *Third*, the establishment of a feeling of cooperation by regular contact between the department and the licensed pharmacist over the state

Dr R P Fischelis next presented his paper on "A Legislative Attempt to Establish Prescription Tolerances" The paper was discussed by Messrs Meads, Durham, Hayman and Hugo Schaefer

A LEGISLATIVE ATTEMPT TO ESTABLISH PRESCRIPTION TOLERANCES

BY ROBERT P FISCHELIS

A law recently passed in New Jersey and known as Chapter 309, P L 1933, regulates the compounding of prescriptions Its principal provisions are as follows

(1) It is made unlawful for any person who is not a registered pharmacist to compound, dispense, fill or sell prescriptions of licensed physicians, dentists, veterinarians or any other licensed medical practitioner

(2) Apprentices employed in a pharmacy may compound, dispense, fill or sell prescriptions of licensed physicians, dentists, veterinarians or any other licensed medical practitioner under the immediate personal supervision of a registered pharmacist.

(3) A prescription is an order for drugs or medicines or combinations or mixtures thereof, written or signed by a duly licensed physician dentist, veterinarian or other licensed medical practitioner

(4) Prescriptions of licensed physicians, dentists, veterinarians or other licensed medical practitioners transmitted by word of mouth, telephone, telegraph or other means of communication must be recorded in writing by the pharmacist, and the record so made constitutes the original prescription which must be filed as indicated below

(5) Every registered pharmacist compounding, dispensing, filling or selling a prescription must place the original written prescription or the prescription as recorded by the pharmacist, in case of telephoned, telegraphed or other communicated orders from practitioners, in a file kept for that purpose

(6) The registered pharmacist must affix to the container of every prescription dispensed a label bearing the name and address of the pharmacist, the date on which the prescription was compounded and an identifying number under which the prescription is recorded in his files The label must also bear the name of the licensed practitioner writing or communicating the prescription and the directions for the use of the prescription by the patient, as directed by the licensed prescriber

(7) It is a violation of the Act if a prescription is found to contain more or less than the quantity of the several or combined ingredients ordered by the prescriber

(8) It is a violation of this Act if the prescription contains ingredients other than those ordered in writing by the prescriber The addition of such inert ingredients as are required in the art of compounding is permissible when such ingredients are not used in any manner to replace the several or combined constituents ordered by the prescriber No replacements can be made without the prescriber s permission

The final weight or volume of a prescription must not be more or less than the original prescription calls for The quantities of individual ingredients must not deviate from the weights or volumes prescribed A reasonable tolerance may be permitted to account for manipulative procedures and normal variations due to unaccountability for accurate weighing and measuring and for the use of drugs of standard strength as well as for strict accuracy in all operations involving subdivision of bulk quantities into the individual doses prescribed "Eye measurements' in subdividing capsules powders and similar dosage forms are not to be relied upon in place of accurate weighing and measuring devices

(9) The Board of Pharmacy has the power to make rules and regulations for the enforcement of this act and is authorized to establish tolerances to allow for deviations from the amounts of ingredients prescribed due to manipulative procedure or deterioration

(10) All violations of this act are punishable by penalties ranging from a minimum of $25 for the first offense to $100 for third and subsequent offenses

We believe this to be the first State law which specifically grants authority to a Board of Pharmacy to establish tolerances for prescription work

Rowland Jones, of South Dakota, next presented a paper on "What Privileges Should Be Granted the Unregistered Dealer under the Pharmacy Laws?' The paper was received and discussed by Messrs Fischelis, Monias, Wilson, McCullough and Philip

WHAT PRIVILEGES SHOULD BE GRANTED THE UNREGISTERED DEALER UNDER THE PHARMACY LAWS?

BY ROWLAND JONES JR

The question of what privileges should be granted unregistered dealers under the pharmacy laws is indeed an important and vexatious one The pharmacy laws of the forty eight states differ in wide range in the treatment of this problem Examination of pharmacy laws of the various states indicate that we have an almost complete absence of uniformity in the methods evolved in the treatment of the evils these laws were designed to mitigate The laws of the several states extend in scope from almost complete freedom from restraint of the unregistered dealer, as embodied in the six- and ten mile qualifications in some states to rigid restriction on nearly all drug products in others

For the reason that my experience in pharmacy law enforcement and the development of changes in pharmacy laws in genera has been limited to a strictly agricultural area in which comparatively long distances separate registered pharmacies, I shall treat the subject in the light of such experience and depend upon subsequent discussion by the group to develop the phases of the problems as they exist in more thickly settled and in urban districts

In South Dakota the evolution of the pharmacy laws since statehood was attained in 1888 has been confined to the last six years As in many states the territorial pharmacy law which was usually written by pharmacists, was carried into the statutes subsequent to admission

to the union This law was drawn in such a manner as to definitely restrict practically all drugs and medicinal preparations to the pharmacist It is regrettable that during this period of rugged individualism, which now seems definitely on the wane, the opinions arising therefrom were reflected in the decisions of the courts of the states in such manner that the law was emasculated by the 'original package" decisions as was the case in many states There can be no questions that these decisions made by courts, to whom the merest whisper of monopoly was abhorrent, resulted in enormous diversion in the sale of drug products into channels foreign to pharmacy It is also true that these decisions which left glaring defects in pharmacy laws generally resulted in strong efforts to correct some of the evils arising therefrom Such efforts have met with varying success in the different states

In South Dakota in 1927, a case was carried to the state supreme court upon the question of the constitutionality of the pharmacy law controlling the sale of patent and proprietary medicines in original packages which resulted in what we know as the Wood's Decision This decision held that a section of the pharmacy law was unconstitutional in its restriction of the sale of patent and proprietary medicines in original packages to the pharmacist This decision immediately resulted in a great deal of confusion and difficulty in the administration of the law by the Board of Pharmacy for the reason that the average mind of the layman seemed unable to differentiate between patent and non patent preparations and between poisonous and non poisonous proprietary preparations Cases were lost which involved the sale of U S P and of poisonous preparations through the erroneous applications of the original package' formula laid down by the Supreme court This condition became so serious that it became necessary to go to the legislature for relief

As a result a patent and proprietary medicine license law was enacted early in 1933 without difficulty This law was in the form of an amendment to that section of the law declared unconstitutional in the Wood's case and had the effect of curing the constitutional defect but which at the same time regained the elements which had been indirectly lost The amendment provided that any merchant operating an established place of business (eliminating itinerant vendors) might apply to the Board of Pharmacy for a license to sell patent and proprietary medicines The fee of $3 is retained by the Board for the purposes of inspection and general pharmacy law enforcement In this amendment we defined patent and proprietary medicines as follows any medicine or drug which is prepared or compounded in proprietary form and sold in original packages, where the sale thereof is *unregulated under the laws of the state* " Thereby, in one step we eliminated the decision of the supreme court in the Wood's case as a precedent for the reason that we cured the defect in the law as pointed out in that decision and at the same time, brought the sale of these products back under our control This definition, which had had no existence in statute before this time, resulted in a clarification of the statute on the dividing line between patent and proprietary medicines on the one hand, and U S P and poisonous preparations on the other, the latter classification being adequately covered in the original law Therefore U S P drugs and preparations and poisonous products may not be sold in other than registered pharmacies in South Dakota We do not feel that any privilege whatsoever should be granted to unregistered dealers in these classifications

Another result which has been advantageous in the enforcement of the pharmacy laws is the provision for the cancellation of the patent and proprietary licenses upon evidence of law violation This gives the Board of Pharmacy a potent weapon in the fight for restrictions on the sale of drugs and medicines

At the time when this legislation was being considered it was said by some that such a license would result in great multiplication of the outlets handling patent and proprietary preparations The fact, as now established, is that a large number of small dealers such as restaurants, filling stations, billiard parlors, hardware dealers and grocers, who in the past have carried small stocks of these preparations have discontinued the sale of these rather than take out the license In many places no licenses have been applied for while in the smaller towns without pharmaceutical service the license has resulted in a quieting of the demand for more privileges for the unregistered dealer which is a force to be reckoned with at every session of the legislature

As for the six- and ten-mile laws which have been passed in some states, I hold the opinion that this is bad law from the standpoint of pharmacy From the standpoint of public health no differentiation in restrictions on this basis is even reasonable, and surely the public in the communi

ties affected will lose sight of the importance of adequate pharmaceutical service Also the prospective student of pharmacy will not be encouraged by the picture presented under such a system

During the past ten years we have witnessed a gradual but distinct retrogression in the statutory protection of the field of pharmacy, mainly through judicial decisions, and during the same period we have advanced rapidly in educational facilities and requirements for the pharmacist If this retrogression continues to such an extent that legal protection on U S P drugs and preparations and poisons is lost as we have lost the protection in the patent and proprietary field, I feel grave concern as to our ability to maintain pharmacy at its present high level

I believe, that as pharmacy law enforcement officials, it behooves us to oppose to the limit further modification of pharmacy law restrictions and to work toward licensing restrictions upon sales of drug products through other outlets While in South Dakota, we were forced to accept a license fee of only $3 for the patent license, I believe that such license should be much higher It would seem from the taxation standpoint, that the license for the sale of patent medicines should be at least as high as that required for the sale of non intoxicating beverages

Where funds for law enforcement are needed by Boards of Pharmacy, license fees should be allocated directly to the Boards for this work Where funds are ample such license fee may be advanced as a source of tax income to the state which is badly needed in most states Needless to say, the latter course offers a valuable lever in a successful legislative campaign

The sale of biological products presents a problem, particularly in parts of the country where the treatment of veterinary diseases provides a lucrative source of income for the pharmacist In many states such products are freely sold without restriction and even in some cases by itinerant vendors The proper storage and handling of biological products and their intelligent dispensing is important Biologicals for veterinary use have a definite public health relation Ignorant use of biologicals constitutes a menace if handled without benefit of expert knowledge Most pharmacy laws define drugs and medicines using the term "for man or for animal" With this in mind we have ample ground for insisting that the sale of veterinary biologicals by other than licensed veterinarians be restricted to the pharmacist For example, the average uninformed storekeeper should not have the privilege of keeping for sale anthrax live spore vaccine

In the field of insecticides and fungicides it seems evident, that we as pharmacists cannot hope to control the general sale of such products which have become staple articles of commerce I believe, however, that such sales by unregistered dealers should be accompanied by such regulations as license, registration of sales labeling, etc The pharmacist who will keep himself informed upon the technical aspects of this rapidly growing field, need have little fear from competitive outlets

This paper is possibly misnamed It should be 'What Privileges Should *Not* Be Granted Unregistered Dealers" It is my contention that no privileges, with the exception of those herein discussed, should be granted in any case without a strenuous fight If the sale of drugs which have been termed "simple household medicines" by those seeking to undermine pharmacy statutes, is allowed by unregistered dealers, it will only serve as an entering wedge and such action will be made a basis and a precedent for further encroachments

U S P drugs and preparations have always been and are now strictly within the field of pharmacy as have been poisons, with the exceptions heretofore noted Let us be prepared to fight for that which is rightfully within the province of pharmacy and not grant privileges to laymen the demand for which has so greatly increased due to the stringency of economic conditions Without strict statutory protection, pharmacy as we know it and as we dream it for the future, cannot continue its logical progress The health of the nations needs this progress

Mr Mac Childs of Kansas next gave an address verbally on the 'Need for Strict Enforcement of Law," in which he suggested the Conference follow the method of the N A B P as to model laws for enforcement The subject was discussed by Messrs Meads, Judisch, Fischelis Durham, Swain and Henry An excerpt follows

THE NEED FOR STRICT ENFORCEMENT OF THE LAW

BY MAC CHILDS

"My speech is going to be a series of recommendations rather than the discussion assigned The National Association Boards of Pharmacy was the conceived idea of several gentlemen and has

done great work It has served its purpose admirably and I think in the next five years will complete what it set out to do, and I hope it will be of greater help to the different parts of the organization which wish to make their laws more stringent and more useful Each of us have ideas that should constitute our laws but the trouble is that we have local ideas and we usually have a local law I have found that in cases of court that the citing of a precedent established in another state is a very great help in clinching the case as the judge and jury usually use the precedent set I might say that I have also found out that the enforcement must be tempered and not too strict as it is primarily for the protection of the public and of course it reverts back very favorably to the pharmacists

"At one time, three years ago, I was Secretary of our Board and thought maybe we had better 'clean-up our own back yard' first We made an inspection of every drug store in Kansas and we notified druggists as to where they were making a violation and notified them that the inspectors would call on them in two or three weeks We requested them to send in a notice to the Secretary of the Board that this violation had been eliminated and it would not be continued Of course, in a great many instances we found that their reply was just like the advertising of many patent medicines it was baloney ' In some cases warrants were sworn out and we received 100% convictions We do not believe convictions are the way to handle this, but with certain people this is necessary After 'the clean-up in our own back yard' we had very little trouble with others We treated everybody alike I was condemned a lot at first and lost many of my friends, who thought I was picking on them After they found they were receiving the same treatment as anyone else they have become my very good friends again and have given me much help We made some mistakes in our law enforcement by trying to be over zealous We tried to stop the sale of paregoric by unregistered pharmacists and only by prescription of physicians We, later, found out that there was a legal use for a 2 oz bottle of paregoric and found that we had made a mistake in allowing it to be sold only by a physician's prescription, as we had given them something these should not have left our control "

The speaker also described how they handled their court cases and said they did not even take a case into court unless they were positive they could get a conviction on it They usually got an opinion from the Attorney General and had this opinion read in the court the case was being tried or else had an Asst Attorney General present He also said that to have the proper evidence that prescriptions were being filled by a person not under the direct supervision of a registered pharmacist it was necessary that the inspector catch him in the act and actually see that this was done or else the evidence would not stand up in court

Hugo H Schaefer, in the absence of Mr Mather, presented the subject, 'Restricting the Practice of Pharmacy to Proper Persons " The subject was then discussed by different members, until 12 15 when the Conference adjourned

Thursday, August 31, 1933

At eight P M a joint session was held in the Pompeian Room with the Section on Education and Legislation The joint session was well attended and it was urged the annual joint sessions be continued

Friday, September 1, 1933

The Conference convened at 2 00 P M in the Colonial Room with the following present Messrs Fischelis of New Jersey, Costello of North Dakota, Mr and Mrs Bruce Philip of California, Henry, Durham and Borniac of Michigan Heine of Texas Hugo H Schaefer and F C A Schaefer of New York, Monias of Illinois King and Milne of Kansas, Teeters of Iowa, Rothrock of Indiana, Swain of Maryland, King and Ford of Ohio

Chairman Swain asked for the presentation of the paper of Mr Woodside of Pennsylvania on the subject "A Change in the Law Enforcement Procedure in Pennsylvania " In the absence of Mr Woodside, the paper was presented by Hugo H Schaefer of New York Upon motion of Mr Henry seconded by Mr Schaefer, the paper was accepted and discussed

A NEW SYSTEM OF LAW ENFORCEMENT IN PENNSYLVANIA

BY JOHN M WOODSIDE *

New deals in governmental procedure are so common at present that it seemed reasonable to expect, in some states at least, a change in the manner of enforcing the pharmacy laws

* Enforcement executive, Pennsylvania Board of Pharmacy

When changes have taken place they have been due to one of two reasons, either dissatis faction with the former system or they were prompted by an economic situation

No administrative agency is free of criticism of its enforcement of laws coming within its jurisdiction and no new system will eliminate this entirely for no law beginning with the Ten Commandments inscribed on the tables of stone by Moses have been enforced to the satisfaction of every one

In Pennsylvania the Board has had the usual amount of dissatisfaction but the change in the manner of enforcing the Pharmacy Laws was brought about through an economic reason The change did not originate with the Board but was instigated within the Department of Public Instruction in which the Board of Pharmacy and all other professional Boards are units Previous to September 1932, the Board of Pharmacy was allotted two agents who devoted all of their time to investigation work for it All the other professional groups were allotted special agents

There were times, of course when a complaint or other matter which required investigation, would be received by two or possibly three professional boards from the same territory at or near the same time Each Board would dispatch its own agent Each Board was allotted a given amount of money for law enforcement by the legislature each biennium and the expense thus incurred was paid out of its funds set aside for it

The Department believed that some system should be devised that would eliminate this duplication of expense This was brought about by the creation of the Law Enforcement Bureau within the Department and all agents were merged under the unified control of this bureau Agents are no longer attached to a particular Board but are now classified as agents of the De partment of Public Instruction The expense incurred by the agents is paid out of the adminis trative fund

The state is divided into districts and each inspector assigned a given district in which he makes all investigation regardless of character The investigations include those for the Board of Pharmacy Medical Licensure Dental Undertakers Engineers Accounting, Architects, Op tometry Barbers etc

Complaints are sent to the Bureau which distributes them to the agents Reports of all investigations are sent to the respective Boards and to the bureau The prosecutions are con ducted by the bureau but only when advised by the Board that this is warranted No action is taken against an individual until after the matter has first been considered by the Board or its en forcement executive

The Board does not believe that this system is perfect at the present time but believes it is capable of improvement From an economical standpoint it is based upon sound reasoning

When first proposed the Boards administering the laws applying to all Healing Arts, en deavored to have a separate unit to be known as the Medical Arts Unit, allotted for their par ticular use but were unsuccessful At the present time ten agents are employed by the Depart ment and as a part of their time is given to the work of the Board of Pharmacy it has enabled the Board to increase the scope of its field work

The work, naturally, has not always been satisfactory With men untrained in the work, it does not seem reasonable to expect that it would be During the year in which the system has been in force, there has been distinct improvement Some agents have of course grasped the work more quickly than others and perform more satisfactorily

The principal criticism which reaches the Board from the drug trade is that the agents are not pharmacists It is true they are not with one exception, one of the Board's special agents being a pharmacist I presume that barbers accountants engineers, etc respectively make com plaints of a similar character

The Pennsylvania Board is interested in this question regarding the employment of phar macist investigators by the Boards in other states It does not, of course have control over the employment of the agents at the present time One of its finest agents who has been in its employ for almost fifteen years is not a pharmacist

It is true that in some states the Board of Pharmacy does not enforce the Pharmacy Laws I understand it does not in the District of Columbia and in many states the services of a detective agency is frequently employed I believe, too that there are some members of Boards of Phar macy who believe the Board should be relieved of that duty In a survey taken in a southern

state recently, it was recommended that the enforcement should be entrusted to the Department of Agriculture, and that investigations should be made by its agents

Possibly the most striking example of non-technical supervision which might be cited in support of the employment of non-pharmacist agents is that which is required by the Federal Constitution viz , that the secretary of the Army and Navy be civilians More recently, should it not be mentioned that at present the entire business structure of the nation, from the largest to the smallest, is under the supervision of an Army General

In both of these instances the responsible administrator is surrounded with technical advisers The situation under the Pennsylvania system as it applies to the Law enforcement in which we are interested is quite the reverse, the agent being required to secure the information and forward it to the Board which is composed of technically qualified persons

In the absence of Mr Parr the subject of Law Enforcement in Michigan" was discussed by Mr Henry of Michigan

At this time, the Chairman appointed a nominating committee consisting of R P Fischelis, *Chairman*, Mr Costello and Mr Heine

Dr Fischelis of New Jersey spoke upon the ' Importance of Synonyms in the Enforcement of Drug Standards and Their Relationship to the Enforcement of Pharmacy Laws " He recommended that the Conference reaffirm their stand on synonyms to the U S P Revision Committee Upon motion of Mr Henry seconded by Mr Durham the recommendations of Dr Fischelis were passed on to the U S P Revision Committee for inclusion in the new revision

The following resolution was presented to the Conference

> *Resolved* That the N A B P request the Conference of Pharmaceutical Law Enforcement Officials to determine ways and means of providing more adequately for the protection of the public in safeguarding all functions that have to do with prescription service from the time a prescription is written for a patient to the ultimate delivery of the finished medicine, so as to assure a continuity of adequate supervision in this important health function

It was moved by Dr Fischelis, seconded by Mr Schaefer, that the Chairman appoint a Committee to study the resolution and report The question was discussed by Messrs Henry, Schaefer, Fischelis and Swain and adopted

Chairman Swain next referred to the proposed amendment to the National Foods and Drug Act and Narcotic Legislation, it was discussed by Messrs Henry, A H King and H Schaefer

The subject of the Proper Enforcement of Fair Practice Codes for the Drug Industry under the NRA," was discussed by Messrs Swain Schaefer and Heine

The Nominating Committee at this time made the following report For *Chairman*, R L Swain of Maryland, *Secretary and Treasurer* M N Ford of Ohio, for *Delegate to the House of Delegates*, F C A Schaefer of New York Upon motion of Mr King seconded by Mr Henry, the report was adopted and the officers declared elected by unanimous vote

Upon motion, duly seconded, the Conference adjourned

R L Swain, *Chairman* M N Ford *Secretary-Treasurer*

COMMITTEES OF THE CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

Chairman R L Swain has appointed the following committees of the Conference of Pharmaceutical Law Enforcement officials Finance, *Chairman*, Frederick C A Schaefer, New York, Rowland Jones, South Dakota, Wesley MacChilds, Kansas, S M Hankins, Florida, Hugo H Schaefer New York, Committee to accurately define the terms, "patent medicine" and "proprietary medicine " *Chairman* A L I Winne Virginia, George W Mather, New York, John M Woodside, Pennsylvania M N Ford Ohio, R P Fischelis New Jersey, Robert L Swain, Maryland

A LEGISLATIVE REPORT

Presented by Fayetta H Philip in the House of Delegates, A PH A as a minority report [1]

"To A V Burdine, *Chairman*

'In presenting this minority report I am not disagreeing with the majority report of the chairman of the Committee, except to this extent That the report dealt wholly with the work of those outside of our appointed committee and not of the committee's work, while mine deals with actual work of at least one member of the Committee

In the first place my appointment to the Committee was made at the time that I was engaged in securing for the drug stores of the United States an exemption ruling from the Tax Division of the Government It was the day of the Ground Breaking Ceremony for the Institute of Pharmacy Building in Washington, D C, that I was shown an article in a *Drug Journal*, which stated that prescriptions which contained certain ingredients would be taxed under the new excise tax laws

'Even though I was told that it was too late to change the ruling, I said it is never too late to right a wrong, and that as I saw the privileges of my profession, they were beyond the tax laws Briefly stated the arguments were, that when a physician wrote a prescription, its ingredients could not be divulged to his patient, nor separated out for taxing

Fellow druggists, the horrors that stared the profession of pharmacy in the face appalled me I can conceive of no ruling that would have caused more worry to pharmacists Within an hour I dispatched a letter to the Department and organized a force to combat the evil Within three days the danger was past although it was about three months before the red tape of the Government machinery unwound sufficiently that the druggists were officially notified that there would be no tax on prescriptions

The personnel who accompanied me to the offices of the proper Government officials were, W Bruce Philip Robert L Swain, Samuel L Hilton, Dr Simmons, C F Kelly and C P Frailey

It was not a simple thing I assure you, but suffice it to say that in the nick of time our protest was entered and justice was secured

A RETAIL DRUG CODE

"There are several important things concerning the Retail Druggist Code, that it is meet that this gathering of pharmacists should be informed about

'For three days, in August 1933, a general retailer's code was argued before Administrator Whiteside, in Washington At the end of the session a Code was written which the proper representative of the respective industries signed I, as your representative, sat through the session and was conversant with the rules that were given to be followed in drawing up our own Code I am sorry to report that during much of the time I was the only druggist present The lack of active participation by druggists in the activities which vitally concern them surprised me

"There are sixty odd thousand retail druggists in the United States and right now every one of them should be awake to the opportunities and dangers of the situation Never was it more important for them to be organized and individually awake Men and women of the profession this is no mere committee report, this is a stirring appeal to rouse you You can go around and pat yourselves on the back, because the President of the United States exempted professional pharmacists from the labor provisions of the Code, but that won't get you anywhere except perhaps, in your own estimation

"The profession of pharmacy is practiced by those who are skilled in the art, and by those who use it as a trade It does not in any way tear down the profession of pharmacy in admitting that those who practice it work certain hours in a drug store, but it does bruise its sensibilities to have the younger generation of pharmacists rant in public about their rights On one hand there is the fact that the greater number of pharmacists are clerks, while on the other the smaller number are proprietors Each is interested in the lives of the citizens of the nation and for long hours and short pay serve behind drug counters seven days in each week Can these facts be ignored? Why should they be?

[1] See Report of Committee on Legislation page 1047, October JOURNAL

"No one was in a better position perhaps than I was to present definite statistics as to what had already been done to uphold working hours in pharmacy and I beg leave to show you the background that I worked from In California in 1910 a very rigid eight-hour law for women was enacted Physicians and professional women were exempted from its rulings Trained nurses in hospitals desired to be exempted and presented a test case Unfortunately a woman pharmacist, Miss Ethel E Nelson Merrit Hospital in Oakland was the person used to try to break the 8 hour law The case was lost in both the local courts and in the Supreme Court of the United States

Nevertheless women pharmacists in California working in drug stores were being considered by the Labor Commissioner as professional women and not to be under the 8 hour labor law, unless they were working in dispensaries in hospitals Otherwise they were considered under the 9 hour pharmacy law which the drug clerks had enacted

"It is necessary to tell that the 9 hour law made by drug clerks had been broken down in a test case, prosecuted by the Druggists Association of Southern California in conjunction with the California Pharmaceutical Association but also I must say that there were places where it would still be applicable Therefore every class of druggists was active in sponsoring a new law It was just at this critical stage of affairs that a woman pharmacist who was working over eight hours on the prescription and drug counters of the most ethical prescription drug store in San Francisco was arrested for working over eight hours

'At a conference with a new Labor Commissioner he stated that even though his predecessor had considered women pharmacists outside the Eight Hour Labor Law still he would not make such a ruling however he said that he would hold the case in abeyance until we women pharmacists could be declared under the pharmacy law

' When the legislature was to convene and acts relative to the Eight-Hour Law were to be introduced, I was chairman of the Legislative Committee of the California Pharmaceutical Association I rewrote the law and I went to Sacramento and after five weeks of battle enacted the present pharmacy law, which allows any pharmacist man or woman, to work 128 hours in any two consecutive weeks but to work only on thirteen days in such two weeks, etc

It was some ten or twelve years ago that the California law was enacted and after organized union labor had fought the passage of the bill every step of the way Thereafter, at each session of the legislature they tried to include women pharmacists in a general labor law Finally the Attorney General made a very definite ruling upon the subject I will couch it only in layman's words, which were to the effect that when the Legislature through its two respective bodies of representatives enacted a law regarding women pharmacists they intended and did classify them as professional and that a general law would not affect them The written ruling is a treasured possession of the Women—the Women s Pharmaceutical Association of the Pacific Coast

'Recently, at the Code hearings when the drug clerks of New York, Baltimore and other places said such disparaging things about pharmacy as a profession I defended it by presenting the wording of the California law which law has been acceptable and workable to both the professional and commercial interests In its enforcement pharmacy and pharmacists were adjudged professional by the highest of law authorities in California "

THE WORLD'S FAIR AT CHICAGO IN 1934

Tile and Till for March has an interesting story of Pharmacy's part at the Century of Progress and its management ably carried on under the direction of Chairman H C Christensen Secretary Frank B Kirby and Miss Esther Barney, who had charge of the exhibit Pharmacy's exhibit will be continued with the reopening of the Fair, on June 1st introducing a new color scheme greatly enlarged and varied new lighting effects and important rearrangement of the grounds to make room for new buildings and exhibits

---

Alf W Pauley was a speaker at the mass meeting of Chicago drugdom on March 20th George L Secord presided over the sessions

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1933–1934

Office of the Secretary 2215 Constitution Ave Washington, D C

LETTER NO 8

March 3, 1934

To the Members of the Council

45 Use of Text of N F V Motion No 11 (Council Letter No 6, page 158) has been carried and P Blackiston Son & Co Inc have been advised

46 Buckram Binding for N F VI Motion No 12 (Council Letter No 6) has been carried and the note executed as directed

47 Election of Members Motion No 13 (Council Letter No 6, page 160) has been carried and applicants numbered 75 to 131, inclusive, are declared elected

48 Time of the 1934 Meeting Motion No 14 (Council Letter No 7 page 160) has been carried unanimously and the attached circular was sent to the pharmaceutical press to the secretaries of state and national associations to the secretaries of boards of pharmacy to the deans of schools and colleges of pharmacy and to the officers of the sections and conferences Arrangements for the meeting and dedication are going forward rapidly

49 Report of Auditors The following has been submitted

February 3, 1934

Mr C W Holton Treasurer
AMERICAN PHARMACEUTICAL ASSOCIATION,
Baltimore Maryland

Dear Sir

I have made an examination of the books and accounts of the AMERICAN PHARMACEUTICAL ASSOCIATION and your report, as Treasurer for the calendar year 1933 and *I hereby certify* that the total cash and securities on hand at December 31 1933, amounting to $371 946 44 is correctly stated

During the year work on the National Headquarters Building in Washington was continued and $234,246 52 was expended from the Headquarters Building fund for this purpose increasing the cost of real estate owned by the ASSOCIATION to $457 205 46

All cash receipts have been traced to deposits in banks to the credit of respective funds for which received and all disbursements have been found evidenced by properly authorized voucher checks

Balances on deposit with the various banks have been reconciled with Certificates from the Depositories and Investment Securities held by the ASSOCIATION have been examined and found to be in agreement with the accounts shown by your report These securities stated in the amount of $140 400 00 are valued at par value as shown by the certificates

Interest accruing on bonds held by the various funds and trusts has been promptly collected on the due dates and deposited to the credit of the proper account

During the year 1933 certain U S Liberty Bonds held by the ASSOCIATION were called for redemption An examination and verification was made of all changes resulting from this

Records maintained by the Secretary of the ASSOCIATION have been examined and transfers of funds from his account to that of the Treasurer have been verified

Respectfully submitted

(Signed) W A JOHNSON,
Certified Public Accountant

For the information of the members of the Council and others interested, the following data are quoted from the Treasurer's report for 1933

JANUARY 1 TO DECEMBER 31 1933

BALANCE AND RECEIPTS

Balance

Cash in Merchants & Newark Trust Co Newark N J (including the Apple Fund)		$ 1,773 05	
Cash in Boston Penny Savings Bank		384 21	
Total Balance January 1 1933			$ 2 157 26

Receipts

For the Current Fund			
From the Secretary (see account attached)		$ 25 537 74	
Interest on Deposit Boston Penny Savings Bank		11 41	
Interest on Deposit Merchants & Newark Trust Co		5 79	
Interest on Headquarters Building Fund		5 071 91	
Interest on Life Membership Fund		6,578 33	
Total Receipts for the Current Fund		$ 37 205 18	
For the Permanent Funds			
Endowment	$ 576 71		
Endowment—Sale of Bonds	2 032 88		
Centennial	188 49		
Ebert Legacy	325 00		
Ebert Prize	42 50		
Life Membership	1 817 52		
Life Membership—Sale of Bonds	11 143 63		
Endowed Membership	7 25		
Research	2 649 16		
Research—Sale of Bonds	6 098 63		
Headquarters Building	5 844 82		
Headquarters Building—Sale of Bonds and Note	301 078 36		
Total Receipts for the Permanent Funds		$331 804 95	
For the Trust Funds			
Wm Procter, Jr Monument	$ 628 37		
Wm Procter, Jr Monument—Sale of Bond	101 43		
J P Remington Honor Medal	49 25		
Total Receipts for the Trust Funds		$ 779 05	
Receipts from Operations		$ 49 334 25	
Receipts from Sale of Bonds and Note		320 454 93	
Total Receipts			$369 789 18
Total Balance and Receipts			$371,946 44

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1933–1934

Office of the Secretary, 2215 Constitution Ave , Washington, D C

LETTER NO 8

March 3, 1934

To the Members of the Council

45 Use of Text of N F V Motion No 11 (Council Letter No 6, page 158) has been carried and P Blackiston Son & Co Inc , have been advised

46 Buckram Binding for N F VI Motion No 12 (Council Letter No 6) has been carried and the note executed as directed

47 Election of Members Motion No 13 (Council Letter No 6, page 160) has been carried and applicants numbered 75 to 131, inclusive, are declared elected

48 Time of the 1934 Meeting Motion No 14 (Council Letter No 7, page 160) has been carried unanimously and the attached circular was sent to the pharmaceutical press, to the secretaries of state and national associations to the secretaries of boards of pharmacy, to the deans of schools and colleges of pharmacy and to the officers of the sections and conferences Arrangements for the meeting and dedication are going forward rapidly

49 Report of Auditors The following has been submitted

February 3 1934

Mr C W Holton Treasurer,
AMERICAN PHARMACEUTICAL ASSOCIATION,
Baltimore Maryland

Dear Sir

I have made an examination of the books and accounts of the AMERICAN PHARMACEUTICAL ASSOCIATION and your report, as Treasurer, for the calendar year 1933 and *I hereby certify* that the total cash and securities on hand at De cember 31, 1933 amounting to $371 946 44 is correctly stated

During the year work on the National Headquarters Building in Washington was continued and $234 246 52 was expended from the Headquarters Building fund for this purpose increasing the cost of real estate owned by the ASSOCIATION to $457 205 46

All cash receipts have been traced to deposits in banks to the credit of re spective funds for which received and all disbursements have been found evidenced by properly authorized voucher checks

Balances on deposit with the various banks have been reconciled with Certificates from the Depositories and Investment Securities held by the ASSOCIA TION have been examined and found to be in agreement with the accounts shown by your report These securities, stated in the amount of $140,400 00, are valued at par value as shown by the certificates

Interest accruing on bonds held by the various funds and trusts has been promptly collected on the due dates and deposited to the credit of the proper account

During the year 1933, certain U S Liberty Bonds held by the ASSOCIATION were called for redemption An examination and verification was made of all changes resulting from this

Records maintained by the Secretary of the ASSOCIATION have been examined and transfers of funds from his account to that of the Treasurer have been verified

Respectfully submitted

(Signed) W A JOHNSON,
Certified Public Accountant

For the information of the members of the Council and others interested the following data are quoted from the Treasurer's report for 1933

JANUARY 1 TO DECEMBER 31 1933

BALANCE AND RECEIPTS

Balance

Cash in Merchants & Newark Trust Co Newark N J (including the Apple Fund)		$ 1,773 05	
Cash in Boston Penny Savings Bank		384 21	
Total Balance January 1 1933			$ 2 157 26

Receipts

For the Current Fund			
From the Secretary (see account attached)		$ 25 537 74	
Interest on Deposit Boston Penny Savings Bank		11 41	
Interest on Deposit Merchants & Newark Trust Co		5 79	
Interest on Headquarters Building Fund		5,071 91	
Interest on Life Membership Fund		6 578 33	
Total Receipts for the Current Fund		$ 37,205 18	
For the Permanent Funds			
Endowment	$ 576 71		
Endowment—Sale of Bonds	2 032 88		
Centennial	188 49		
Ebert Legacy	325 00		
Ebert Prize	42 50		
Life Membership	1,917 52		
Life Membership—Sale of Bonds	11,143 63		
Endowed Membership	7 25		
Research	2 649 16		
Research—Sale of Bonds	6 098 63		
Headquarters Building	5,844 82		
Headquarters Building—Sale of Bonds and Note	301 078 36		
Total Receipts for the Permanent Funds		$331 804 95	
For the Trust Funds			
Wm Procter, Jr Monument	$ 628 37		
Wm Procter, Jr Monument—Sale of Bond	101 43		
J P Remington Honor Medal	49 25		
Total Receipts for the Trust Funds		$ 779 05	
Receipts from Operations		$ 49 334 25	
Receipts from Sale of Bonds and Note		320 454 93	
Total Receipts			$369,789 18
Total Balance and Receipts			$371 946 44

DISBURSEMENTS AND BALANCE

From the Current Fund

General Expenses

	Budget Appropriations	Budget Disbursements
Salaries	$ 10,800 00	$ 10,383 26
Rent	900 00	935 00
Telegraph and Telephone	200 00	210 67
Clerical Expenses	1,400 00	1,362 67
Printing Postage and Stationery	1,100 00	814 57
Office Supplies	150 00	199 71
Traveling Expenses	700 00	169 21
Premium on Bonds	50 00	50 00
Auditing	75 00	75 00
Certificates	50 00	11 00
Miscellaneous Expenses	100 00	36 33
Scientific Section	25 00	27 41
Section on Education and Legislation	25 00	23 03
Section on Practical Pharmacy and Dispensing	25 00	13 65
Section on Commercial Interests	25 00	10 10
Section on Historical Pharmacy	25 00	30 97
Commission on Proprietary Medicines	25 00	
Committee on Local Branches	25 00	
Committee on Membership	500 00	281 00
Committee on State and National Legislation	50 00	
Committee on Syllabus	50 00	
Committee on Unofficial Standards	50 00	50 00
Committee on Pharmacy Week	250 00	250 00
Inter Society Color Council	25 00	25 00
International Pharmaceutical Federation	120 00	
Metric Association	10 00	
American Conference on Hospital Service	25 00	25 00
Headquarters Building Campaign	1 000 00	814 32
Year Book	3,750 00	3 409 08
Library	50 00	
	$ 21 580 00	$ 19 206 98
Open Accounts		
JOURNAL	$ 11,000 00	$ 9 504 72
National Formulary	1,800 00	4 231 01
Recipe Book	500 00	130 51
Badges and Bars	50 00	
Total Budget Appropriations	$ 34 930 00	
Total Budget Disbursements		$ 33 073 22
Federal Tax on Checks		4 50
		$ 33 077 72

From the Permanent Funds

Endowment Fund Purchase of Bonds	$ 2 050 03
Ebert Prize Medal for 1933	49 20
Life Membership, Transfer of Interest and Tax	6,578 37
Life Membership, Purchase of Bonds	6,150 01
Research Purchase of Bonds and Tax	6,150 03
Research, Awards for 1933–1934 and Tax	1,000 02
Research, National Conference on Pharmaceutical Research and Tax	25 02

Research, Expenses for Reprints, etc , and Tax	18 80	
Headquarters Building, Transfer of Interest	5,071 91	
Headquarters Building, Architect's Fees and Expenses	6,950 56	
Headquarters Building, Payment of Note and Interest	30,005 84	
Headquarters Building, Interest on Mortgage	2,002 00	
Headquarters Building, Taxes	694 32	
Headquarters Building, Payment on Building	227 583 73	
Total Disbursements from Permanent Funds by Voucher Checks and Charges		$294,329 90
From the Trust Funds		
Remington Honor Medal, Medal for 1933	$ 35 45	
Total Disbursements from Trust Funds by Voucher Checks		35 45
		$327,443 07
Credits to Permanent and Trust Funds of Excess of Receipts and Disbursements		38,218 65
Total Disbursements		$365 661 72
Balance in Current Fund		
Cash in Merchants and Newark Trust Co (including Apple Fund)	$ 3,840 84	
Cash in Boston Penny Savings Bank	395 62	
Cash in Baltimore Trust Co , Secretary's Account	2 048 26	
Total Balance in Current Fund, December 31, 1933		$ 6,284 72
Total Disbursements and Balance		$371,946 44

COMPARISON OF FUNDS

Current Fund	Dec 30 1932	Dec 30, 1933
Cash in Merchants and Newark Trust Co	$ 1,773 05	$ 3,840 84
Cash in Boston Penny Savings Bank	384 21	395 62
Cash in Baltimore Trust Co		2,048 26
	$ 2 157 26	$ 6,284 72
Permanent Funds		
Endowment Fund	$14,631 09	$ 15,190 65
Centennial Fund	5,552 45	5,740 94
Ebert Legacy Fund	7,954 82	8 279 82
Ebert Prize Fund	1,051 60	1,044 90
Life Membership Fund	41,209 81	36,442 58
Endowed Membership Fund	125 00	132 25
Research Fund	62 932 58	64,486 44
Headquarters Building Fund	500,591 00	494,252 34
Total Permanent Funds	$634,048 35	$625,569 92
Trust Funds		
Wm Procter, Jr Monument Fund	$ 16 646 72	$ 17,276 52
Jos P Remington Honor Medal Fund	1,289 79	1,303 59
Total Trust Funds	$ 17,936 51	$ 18,580 11
Summary of Funds		
Current Fund	$ 2 157 26	$ 6,284 72

Permanent Fund	634 048 35	625 569 92
Trust Funds	17,936 51	18,580 11
Total Funds	$654 142 12	$650 434 75

SUMMARY OF ASSETS AND TRUST FUNDS

	Dec 31, 1930	Dec 30, 1931	Dec 30, 1932	Dec 30 1933
Current Funds	$ 4 478 44	$ 2,691 32	$ 2,157 26	$ 6 284 72
Permanent Funds	621 347 10	632,606 81	634,048 35	625,569 92
Total Assets	$625,825 54	$635 298 13	$636 205 61	$631 854 64
Trust Funds	16,769 71	17 357 52	17,936 51	18,580 11
	$642,595 25	$652,655 65	$654,142 12	$650 434 75

50 St John s University College of Pharmacy Student Branch, A Ph A The following application has been submitted with the dues of the applicants

We the undersigned students in the course of Pharmacy of St John's University, College of Pharmacy desire to establish a student branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at the University and hereby petition the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION to approve the formation of the Branch and its preambles and by-laws as submitted herewith

Andor Hacker
Herman J Steinberg
Ada J Bizzarri
Seymour Stern
Libera Palmeri
Robert Timmel
Bernard Meyerson
William McKaba
Alexander Becker
Harry Figatner
Max Vogel
Irving Koenig
William Matz
Nicholas Arancio
Nicholas Candi
Patrick J Dishkin
Arthur De Ianni
Jack Ziving
Herbert Bernstein
Armando Font
Henry Wishinsky

CONSTITUTION

"*PREAMBLE*—This Branch has been established to stimulate a greater professional and scientific interest in the students at St John's University and to acquaint students with the various pharmaceutical organizations and their work before they go out into practice We the undersigned do hereby resolve to constitute ourselves into a student branch of the AMERICAN PHARMACEUTICAL ASSOCIATION for the purpose of advancing the objects for which the body was founded The Branch hereby adopts for its guidance the Constitution and By-Laws of the AMERICAN PHARMACEUTICAL ASSOCIATION and its members hereby subscribe to them "

The By Laws follow those of the University of Wisconsin Student Branch printed on page 76, *et seq*, January JOURNAL, 1932 this obviates the necessity of reprinting

(*Motion No 15*) *It is moved by Kelly that the application for the formation of the St John's University, College of Pharmacy, Student Branch and the proposed Constitution and By Laws be approved* A vote is called for at this time but will be considered as tentative if there is objection or if any member wishes to discuss it

51 Applicants for Membership The following applications properly endorsed and accompanied by the first year's dues have been received

No 132, Samuel H Shagaloff, 263 Frankel Blvd, Merrick N Y, No 133, Jack Arden Keyes Lemon, c/o Drug Trading Co, Toronto Canada, No 134 Cyril E Souch, c/o Jury & Lovell Ltd, King St E Oshawa, Canada No 135 Benjamin Davidov 5300 Edmondson Ave

Baltimore, Md , No 136, F E Johnston President Shuptrine Co , 31 Barnard St , Savannah, Ga , No 137, Harry Vane, Dover Delaware No 138 Emil G Reichlin 72 Davis Ave Kearny, N J , No 139, George P Grau Conkling St & Fait Ave Baltimore Md , No 140, George W Brittingham, Wilmington Delaware No 141 E W Sterling Church Hill, Md , No 142 H L Chichester 290 Washington Ave Macon Ga No 143 Samuel M Goodman, 24 Brauford Pl , Newark, N J , No 144 Samuel Solomon 631 W Lexington St Baltimore Md , No 145 Violet B Noll, 851 N Bentalou St Baltimore Md No 146 Charles Pfeifer 820 E 33rd St , Baltimore, Md , No 147, George H Dannettel 301 S Broadway Baltimore, Md , No 148, Frank M Budacz, 3138 O Donnell St Baltimore Md No 149 J S Patti, 501 Washington Blvd , Brentwood, Md No 150 Emil P Martini 47 Linden St , Hackensack, N J , No 151, J H Hoagland, 365 George St New Brunswick N J No 152 George A DeSesso, Mendham Rd , Gladstone, N J No 153 Bernard John Preston Jr 351 Yale Ave , Baltimore, Md , No 154, Theodore Thomas Dittrich 1300 N Milton Ave Baltimore Md , No 155, James Jenkins Ripley Tenn No 156 Donald Wheeler Butler Box 2112 University Sta , Gainesville, Fla , No 157 Edmund Donald Boudreau 15 Center St Bernardsville, N J , No 158, Alan Norris 216 Medical Arts Bldg Hamilton Ont Canada No 159, Marjorie Barr Moore, Abbott Laboratories N Chicago Ill No 160 Harry Stine 700 W 175th St New York N Y , No 161, George G Biddle, 7743 Colfax Ave Chicago Ill No 162, Felix H Kaminski, 808 S Milton Ave , Baltimore, Md No 163 Marguerite F Crozat 4435 Hamilton St , New Orleans, La , No 164, Charles Werner 622 Main St Tell City Indiana No 165 William A Worner, 705 Canal St , New Orleans La No 166 William L Gruber 338 S 19th St , Newark, N J No 167, Raymond L Thatcher 56 Tiona Ave Bellerville N J No 168 Michael Joseph Dausch, 501 N Glover St , Baltimore Md No 169 Zeal M Gibson 1731 Halyoke Ave , E Cleveland, Ohio, No 170 Otto P Cray 41st St & Fulton Ave , Cleveland, Ohio, No 171 Anthony S Casabona, 85 Glenridge Ave Glen Ridge N J No 172 Harold Gomes Cassidy 188 E McMillan Cincinnati Ohio No 173 Lillian Richards Herman Kiefer Hospital, Detroit, Michigan, No 174, Thomas J C Johnson 5 William Street Cardigan South Wales, No 175, Y Thomas Oester, Box 100 Notre Dame Md No 176 William H de Hartog 332 Fon du Lac St , Waupun Wisconsin No 177 Ralph A Clark N Broad St Phillipsburg, N J No 178, A Lee Caldwell, 5637 Carrollton Ave Indianapolis Ind No 179, Lewis William Butz, Delaware Ave & Vine St , Philadelphia Pa No 180 Sylvester H Dretzka, South Milwaukee, Wisconsin No 181, H D Barnett 117 E Potomac St Brunswick Md No 182, T B Smith 101 N Ashley St , Valdosta Ga

(*Motion No 16*) *Vote on Applications for membership in the American Pharmaceutical Association*

52 Local Secretary for 1933–1934 The Local Committee on Arrangements for the coming meeting was selected by the District of Columbia Pharmaceutical Association President Paul Pearson and Secretary A F Corsuch are serving as chairman and secretary, respectively, of the Committee

The Committee has recommended Mr F A Delgado as local secretary Mr Delgado is connected with the Department of Commerce and has been a regular attendant at A PH A meetings

F A Delgado is nominated by Kelly as local secretary If other members of the Council desire to submit nominations they are requested to do so promptly in order that a vote may be called for promptly

53 Headquarters for the 1934 Meeting The local Committee on Arrangements has recommended the Hotel Shoreham as headquarters The hotel is located on Connecticut Avenue out of the business district, and has ample accommodations A special rate of $4 per day per person for single room and $3 per day per person for double rooms has been arranged, all rooms with combination shower and bath

(*Motion No 17*) *It is moved by Kelly that the Hotel Shoreham be approved as headquarters for the 1934 meeting* A vote on this motion will be called for in about ten days

E F KELLY, *Secretary*

Eighty-second annual meeting of AMERICAN PHARMACEUTICAL ASSOCIATION and dedication of the American Institute of Pharmacy during week of May 7th See Transportation under department "Societies and Colleges"

Permanent Fund	634 048 35	625,569 92
Trust Funds	17,936 51	18,580 11
Total Funds	$654,142 12	$650 434 75

SUMMARY OF ASSETS AND TRUST FUNDS

	Dec 31 1930	Dec 30, 1931	Dec 30, 1932	Dec 30 1933
Current Funds	$ 4 478 44	$ 2,691 32	$ 2 157 26	$ 6 284 72
Permanent Funds	621,347 10	632 606 81	634,048 35	625 569 92
Total Assets	$625,825 54	$635 298 13	$636,205 61	$631,854 64
Trust Funds	16,769 71	17 357 52	17 936 51	18,580 11
	$642,595 25	$652,655 65	$654 142 12	$650,434 75

50 St John s University, College of Pharmacy, Student Branch, A Ph A The following application has been submitted with the dues of the applicants

'We the undersigned students in the course of Pharmacy of St John's University, College of Pharmacy, desire to establish a student branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at the University and hereby petition the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION to approve the formation of the Branch and its preambles and by laws as submitted herewith

Andor Hacker
Herman J Steinberg
Ada J Bizzarri
Seymour Stern
Libera Palmeri
Robert Timmel
Bernard Meyerson
William McKaba
Alexander Becker
Harry Figatner
Max Vogel
Irving Koenig
William Matz
Nicholas Arancio
Nicholas Caridi
Patrick J Dishkin
Arthur De Ianni
Jack Zwing
Herbert Bernstein
Armando Font
Henry Wishinsky

CONSTITUTION

"*PREAMBLE*—This Branch has been established to stimulate a greater professional and scientific interest in the students at St John's University and to acquaint students with the various pharmaceutical organizations and their work before they go out into practice We the undersigned, do hereby resolve to constitute ourselves into a student branch of the AMERICAN PHARMACEUTICAL ASSOCIATION for the purpose of advancing the objects for which the body was founded The Branch hereby adopts for its guidance the Constitution and By-Laws of the AMERICAN PHARMACEUTICAL ASSOCIATION and its members hereby subscribe to them"

The By Laws follow those of the University of Wisconsin Student Branch, printed on page 76, *et seq*, January JOURNAL 1932 this obviates the necessity of reprinting

(*Motion No 15*) *It is moved by Kelly that the application for the formation of the St John's University College of Pharmacy, Student Branch and the proposed Constitution and By Laws be approved* A vote is called for at this time but will be considered as tentative if there is objection or if any member wishes to discuss it

51 Applicants for Membership The following applications properly endorsed and accompanied by the first year's dues have been received

No 132 Samuel H Shagaloff 263 Frankel Blvd, Merrick, N Y, No 133, Jack Arden Keyes Lemon, c/o Drug Trading Co, Toronto, Canada, No 134, Cyril E Souch, c/o Jury & Lovell Ltd King St E, Oshawa, Canada, No 135, Benjamin Davidov, 5300 Edmondson Ave,

Baltimore, Md , No 136, F E Johnston, President Shuptrine Co , 31 Barnard St , Savannah, Ga No 137 Harry Vane, Dover, Delaware No 138, Emil G Reichlin, 72 Davis Ave , Kearny N J , No 139 George P Grau, Conkling St & Fait Ave , Baltimore, Md , No 140, George W Brittingham Wilmington, Delaware, No 141, E W Sterling Church Hill, Md , No 142, H L Chichester, 290 Washington Ave , Macon, Ga , No 143 Samuel M Goodman 24 Brauford Pl , Newark, N J , No 144, Samuel Solomon, 631 W Lexington St , Baltimore, Md , No 145 Violet B Noll, 851 N Bentalou St , Baltimore, Md No 146, Charles Pfeifer 820 E 33rd St Baltimore, Md , No 147, George H Dannettel, 301 S Broadway, Baltimore, Md , No 148, Frank M Budacz, 3138 O'Donnell St , Baltimore, Md , No 149, J S Patti 501 Washington Blvd , Brentwood, Md , No 150, Emil P Martini 47 Linden St , Hackensack, N J , No 151 J H Hoagland, 365 George St New Brunswick, N J No 152 George A DeSesso, Mendham Rd , Gladstone, N J No 153, Bernard John Preston Jr , 351 Yale Ave , Baltimore, Md , No 154 Theodore Thomas Dittrich 1300 N Milton Ave , Baltimore, Md , No 155, James Jenkins Ripley Tenn , No 156 Donald Wheeler Butler, Box 2112 University Sta , Gainesville, Fla , No 157, Edmund Donald Boudreau, 15 Center St , Bernardsville, N J No 158 Alan Norris 216 Medical Arts Bldg , Hamilton, Ont , Canada, No 159, Marjorie Barr Moore, Abbott Laboratories, N Chicago, Ill , No 160, Harry Stine, 700 W 175th St , New York N Y , No 161, George G Biddle, 7743 Colfax Ave , Chicago, Ill , No 162 Felix H Kaminski, 808 S Milton Ave , Baltimore, Md No 163, Marguerite F Crozat, 4435 Hamilton St , New Orleans, La , No 164 Charles Werner 622 Main St , Tell City, Indiana, No 165, William A Worner, 705 Canal St , New Orleans, La , No 166 William L Gruber, 338 S 19th St , Newark, N J , No 167, Raymond L Thatcher, 56 Tiona Ave Bellerville N J , No 168, Michael Joseph Dausch, 501 N Glover St , Baltimore, Md No 169 Zeal M Gibson, 1731 Halyoke Ave , E Cleveland, Ohio, No 170, Otto P Gray, 41st St & Fulton Ave , Cleveland, Ohio No 171, Anthony S Casabona 85 Glenridge Ave Glen Ridge, N J , No 172 Harold Gomes Cassidy 188 E McMillan, Cincinnati, Ohio, No 173, Lillian Richards, Herman Kiefer Hospital Detroit Michigan, No 174, Thomas J C Johnson, 5 William Street Cardigan, South Wales, No 175, Y Thomas Oester Box 100, Notre Dame, Md , No 176 William H de Hartog, 332 Fon du Lac St , Waupun, Wisconsin, No 177, Ralph A Clark, N Broad St , Phillipsburg, N J , No 178, A Lee Caldwell 5637 Carrollton Ave , Indianapolis, Ind , No 179, Lewis William Butz, Delaware Ave & Vine St , Philadelphia, Pa , No 180, Sylvester H Dretzka, South Milwaukee, Wisconsin, *No 181, H D Barnett, 117 E Potomac St , Brunswick, Md , No 182 T B Smith,* 101 N Ashley St , Valdosta, Ga

(*Motion No 16*) *Vote on Applications for membership in the American Pharmaceutical Association*

52 Local Secretary for 1933–1934 The Local Committee on Arrangements for the coming meeting was selected by the District of Columbia Pharmaceutical Association Presi dent Paul Pearson and Secretary A F Gorsuch are serving as chairman and secretary, respectively, of the Committee

The Committee has recommended Mr F A Delgado as local secretary Mr Delgado is connected with the Department of Commerce and has been a regular attendant at A PH A meetings

F A Delgado is nominated by Kelly as local secretary If other members of the Council desire to submit nominations they are requested to do so promptly in order that a vote may be called for promptly

53 Headquarters for the 1934 Meeting The local Committee on Arrangements has recommended the Hotel Shoreham as headquarters The hotel is located on Connecticut Avenue out of the business district and has ample accommodations A special rate of $4 per day per person for single room and $3 per day per person for double rooms has been arranged all rooms with combination shower and bath

(*Motion No 17*) *It is moved by Kelly that the Hotel Shoreham be approved as headquarters for the 1934 meeting* A vote on this motion will be called for in about ten days

E F KELLY, *Secretary*

Eighty-second annual meeting of AMERICAN PHARMACEUTICAL ASSOCIATION and dedication of the American Institute of Pharmacy during week of May 7th See Transportation under department "Societies and Colleges"

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council"
—Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

CHICAGO

The monthly meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the University of Illinois College of Medicine, February 20 1934

Dr Mary Rising Professor of Chemistry, University of Chicago was introduced as the speaker of the evening Her subject was entitled Hypnotics"

Dr Rising introduced the subject of hypnotics by beginning with a short history of the changes during the years in the use of simple drugs up to the present day use of many of the complicated coal tar products

The production of procaine, which is far less toxic than cocaine, was cited as a triumph of the synthetic chemists

Hypnotics were described as drugs which produce sleep but do not relieve pain To day they are taking the place of narcotics to a great extent where only sleep is wanted

A discussion followed of many of the popular barbiturate derivatives and their structural formula was shown by lantern slides Mention was made of the possibilities of further research work on the barbiturates and what the chemists are striving for

After the very interesting presentation by Dr Rising Mr Morrison, head of the drug department of the University of Illinois Research Hospital, exhibited some prescription incompatabilities that he had encountered and suggested methods of overcoming them

LAWRENCE TEMPLETON, *Secretary*

NEW YORK

The February meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the College of Pharmacy, Columbia University President Ballard was in the chair, and about fifty members and their guests attended

After the meeting had been called to order the report of the secretary was read and accepted

Due to the absence of Treasurer Currens his report was read Dr Bilhuber *Chairman* of the Audit Committee then reported that he had gone over the accounts with the *Treasurer*, and had found everything in order

Chairman Lehman, of the Committee on Education and Legislation, reported by letter that he had appointed Messrs Dyer and Dworkin to serve on his Committee

Chairman Kassner, of the Professional Relations Committee next reported the appointment of Messrs Gerstner and Frederick Lascoff as members of his Committee

Chairman George Simpson, of the Membership Committee, now reported the following appointments to his Committee Messrs Rauben heimer, Kidder Ligorio, Hutchins and Lippe Applications for Branch membership of the following were reported by Mr Simpson Edward Klar, Samuel Henkin, Jonathan Gordon Ralph Foran and Frank Hitchcock Mr Harry Stine's application for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION was also submitted

Following a motion by Dr H V Arny, seconded by Dr Kassner, the applications for Branch membership were accepted and the applicants were voted in as members The application of Harry Stine was forwarded to Secretary Kelly

Chairman Dauer, of the Committee on the Progress of Pharmacy, reported the appointment of Messrs Kassner Schaefer Dyer, Wimmer and Kern to membership on his Committee

The president then announced the topic for the March meeting and for the April meeting and urged all present to attend

Following this President Ballard introduced the speaker for the evening, Mr Marshall G Meriam, who discussed the Manufacture of Clinical Thermometers The speaker was assisted by Mr Barthen, who demonstrated while Mr Meriam discussed the various steps in the manufacture of clinical thermometers

The speaker began his discussion by briefly reviewing the history of the clinical thermometer and also described some of the early types He then proceeded with a description of the manufacture of the glass tubing used in making thermometers Several of his exhibits showed clearly some of the intermediate stages in drawing out the glass The actual manufacture of a thermometer was then carried out by Mr Barthen while Mr Meriam carefully explained each step Of unusual interest was the projection on a screen of the constriction in a clinical thermometer This showed very clearly how the constriction operates The importance of aging thermometers before calibration was pointed out by the speaker The final calibrating of the finished thermometer was then described

Many practical hints for the use and sale of thermometers were included by Mr Meriam He carefully demonstrated the proper method for 'shaking down" and likewise explained the reasons for the various prices of thermometers

Many types and forms of clinical thermometers and cases were shown and Mr Barthen went through the manufacture of thermometers repeatedly until every one present had seen the delicate operations at close hand

At the completion of Mr Meriam's address a rising vote of thanks was accorded the speaker and his assistant, and the meeting was formally adjourned to give every one an opportunity to see the exhibits

RUDOLF O HAUCK *Secretary*

ANNOUNCEMENT OF APRIL MEETING

The meeting of New York Branch, A PH A , on April 9th will be held at 8 15 P M in the College of Pharmacy Columbia University, 115 W 68th St , New York City This meeting will be devoted entirely to a celebration of the 50th Anniversary of the National Formulary Plans at present call for the co operation of the Kings County Pharmaceutical Society and the Deutsches Apotheker Verein Persons prominently connected with the N F work will be present and it is hoped to have Dr Charles F Schleusner recount some reminiscences

RUDOLF O HAUCK, *Secretary*

NORTHERN NEW JERSEY

The February 19th meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was one of the most interesting that we have had The regular routine of business was suspended by President Little and the members enjoyed two very good addresses, one by Mr Charles Nichols, on Pharmacy in the Near East, ' and the other by Doctor James C Munch on the new hormone ' Tissue Extract "

Mr Nichols the first speaker was born in the Near East and attended the American University of Beirut where he studied Pharmacy His introductory remarks were, therefore, devoted to a description of the university and the country surrounding it He then began the story of the life of a pharmacy student in that English speaking institution

In order to matriculate in the course in pharmacy, one must have already earned a B A degree or possess its equivalent in education The work is divided into three parts first a preliminary academic year preparatory to a year of practical work in a licensed pharmacy which is followed by another period of class and laboratory instruction

The student undergoes regular course examinations at the end of the first year He then sits in special oral examination with a commission from the Turkish Government before he is permitted to engage in the year of practical work This last inquisition is conducted either in French or Turkish according to the wish of the candidate The next serious examinations are the finals in his senior year

Upon graduation the student is presented with the degree of Master of Pharmacy by the

University and a diploma from His Majesty's Imperial Medical Science University These credentials take the place of a state board certificate and give their holders the right to practice pharmacy in any part of Turkey, Egypt and the Sudan

The pharmacist in the Near East," Mr Nichols said is ranked professionally with the physician and works in close harmony with the latter The pharmacies too, are truly pro fessional and strange as it may seem French is the language of the prescription

Doctor Munch next on the program began his talk on Tissue Extract ' with a demon stration of the variation taste with different individuals Mr Arnold Quici assisted in the experiment Doctor Munch then explained that Tissue Extract is the name which has been given to a hormone obtained from the pancreas, principally but also from other tissues and from the urine It appears that this hormone is elaborated in the pancreas passes into the circulation, is deposited in various organs (brain stem liver kidneys, etc) and is even tually excreted in the urine When the pan creas of an experimental animal is removed, there is a prompt decrease in the amount of the hormone in the urine or tissue

It is obtained in connection with extraction of insulin from pancreas on a commercial scale The ground pancreas is extracted with acid alcohol allowed to stand, neutralized and filtered The filtrate which contains both insulin and Tissue Extract is then concentrated, the fat removed, and the insulin precipitated out with ammonium sulphate at the isoelectric point The supernatant solution is concen trated *in vacuo*, insoluble material filtered off and the "Tissue Extract Concentrate ' is available for standardization and use After a series of intravenous injections of epi nephrine have been made in a surgically anes-thetized dog, a series of injections of Tissue Extract are given and the fall in blood pressure determined A mixture of known volumes of Tissue Extract and epinephrine is then in-jected until that proportion is determined which causes neither a rise nor a fall in blood pressure One unit has been considered to be that volume of Tissue Extract neutralizing the pressor ac tivity of 1 gamma (0 001 mg) of epinephrine Material used in research and in clinical studies contains 10 units per cc

The action of epinephrine has been neu-tralized in every method by which its action has been measured (blood pressure, blood sugar constricting tissues etc)

Clinically studies on about 500 patients with angina pectoris have shown that the course of treatment produced complete disappearance of the anginoid pains in 50 per cent, dis appearance during treatment in an additional 35 per cent, and no demonstrable effects in 15 per cent In treating about 100 cases of thrombo angiitis obliterans and endarteritis obliterans, about the same percentage of relief was observed Tissue Extract appears to be useful in treating vasomotor disturbances such as angina pectoris, Buerger's disease and inter mittent claudications

The addresses concluded, the Membership Committee nominated the following individuals for membership in the branch Anthony S Casabona, J Stanley Steiner and Raymond L Thatcher They were elected

A P Shenkel, Division Sales Manager for Sharp and Dohme spoke for a few minutes, after which the meeting was adjourned

L W Rising, *Secretary*

PITTSBURGH

The Pittsburgh Branch of the American Pharmaceutical Association met February 27, 1934, in the lecture room of the Falk Clinic Prof Clarence T Van Meter presided

An election of officers was held The follow ing will serve the Pittsburgh Branch for the 1934–1935 term

President, Raymond Hornfeck
Vice-President, John Ray Burrows
Secretary Frank S McGinnis
Delegate, C Leonard O'Connell

Doctors Leo H Criep and Ralph V Robin son, members of the teaching staff of the School of Medicine, University of Pittsburgh, ad dressed the group The following is a short abstract of the paper

' The United States spends on an average of about four hundred million dollars a year on patent medicines These products are fre quently not patented at all because the manufacturer cannot prove that they are either new or useful Furthermore, the formula would have to be disclosed, and this would rob the product of the very secrecy upon which the manufacturers depend for success of marketing the nostrum While the Pure Food and Drugs Act of 1906 was undoubtedly a step in the right direction, the law is sufficiently weak as to allow many loopholes and permit a great deal of quackery

"The agitation at the present time on the Tugwell Bill, or a modification thereof, should be supported by the medical and pharmaceutical professions Steps should be taken in the direction of curbing the unfair and fraudulent advertising going over the air daily Unless this is done soon we shall find that its harmful effects will, by far, exceed that of newspaper advertising

'It is to the credit of high grade pharmaceutical journals that they have always spoken against the frauds practiced by some patent medicine manufacturers For a great deal of this the medical profession is to blame, because it has helped to popularize various proprietary medicines The weakness of the courses of pharmacology and therapeutics in our medical schools to day is also an important factor

'A plea was made for closer cooperation between the medical and the pharmaceutical profession

Dr Ralph V Robinson presented Burke and Hare" in a very entertaining and informative manner His introductory remarks concerned the history of early medicine, and how schools of anatomy came into being He told of the life of Burke and Hare and the part they played in supply material for anatomical study Interesting lantern shades were used by Dr Robinson, for illustrating the escapades of the notorious characters, Burke and Hare"

FRANK S MCGINNIS, *Reporter*

ST JOHN'S UNIVERSITY COLLEGE OF PHARMACY, STUDENT BRANCH

Thirty students, several Alumni and members of the faculty attended a dinner in Brooklyn in honor of the institution of the St John's University, College of Pharmacy Student Branch of the A PH A Permission had been granted to proceed with the dinner pending the parent association Max Vogel, '34, president of the newly organized branch acted as toastmaster, the speakers were Professor John J Corcoran and Dr Otto Raubenheimer, other guests included Professor Vernon Brooks and Professor Frank Bulda

In his most enlightening and inspiring talk Dr Raubenheimer, the guest of honor, traced the history of the AMERICAN PHARMACEUTICAL ASSOCIATION and explained the work carried on by the organization He described the development of an American literature of pharmacy, specifically discussing the PROCEEDINGS, the YEAR BOOK, the JOURNAL, the National Formulary and the Recipe Book published by the ASSOCIATION The value of the work done by the Scientific Section, the Historical Section and the Section on Dispensing Pharmacy was also discussed by Dr Raubenheimer

Other officers of the newly formed branch are Herman J Steinberg, '34, *Vice President*, Bernard Meyerson, *Secretary*, and William McKaba '34 *Treasurer*

FIFTIETH ANNIVERSARY, TEMPLE UNIVERSITY

Temple University celebrated its fiftieth anniversary the week of February eleventh with many meetings and activities suitable to the occasion The college, founded by Russell H Conwell, author of the famous lecture Acres of Diamonds ' has grown in student enrollment from seven in 1884 to approximately twelve thousand in 1934 The property and equipment accumulated during this period is valued at about eight million dollars

The School of Pharmacy promoted an elaborate program which included displays demonstrations visitations and meetings of interest to pharmacists, physicians and dentists The Dean and Faculty entertained at dinner the delegates in attendance from other Schools of Pharmacy State Boards and Pharmaceutical and Drug Associations United States Senator Royal S Copeland delivered the principal address at this meeting, and at the Founder's Day graduation exercises he was the recipient of the honorary degree of Doctor of Science

Short speeches of congratulation and felicitation were made by J W Sturmer, Dean Phila College of Pharmacy representing the American Association of Colleges of Pharmacy R E Lee Williamson secretary, Federal Wholesale Druggists' Association, John M Woodside, member Penna State Board of Pharmacy, Robert P Fischelis, president-elect, AMERICAN PHARMACEUTICAL ASSOCIATION, W Bruce Philip, general counsel, N A R D , W Scott Taylor, Jr , president, New Jersey State Board of Pharmacy, Wilmer Krusen, president Philadelphia College of Pharmacy, Leo G Penn president, Philadelphia Association of Retail Druggists John C Walton, Executive Committee, Penna Pharmaceutical Association, Frank H Eby, president, Phila Branch, AMERICAN PHARMACEUTICAL ASSOCIATION, Charles H LaWall dean Philadelphia College of Phar

macy, Lloyd N Richardson, president Maryland Board of Pharmacy, John C Krantz, Jr, second vice president, Henry Brown, Executive Committee Penna Pharmaceutical Association, Charles T Pickett, secretary, Philadelphia Association Retail Druggists

Robert P Fischelis, president elect of the AMERICAN PHARMACEUTICAL ASSOCIATION made the principal talk at the Pharmacy convocation Wednesday afternoon

A large number of guests students and alumni listened to his scholarly paper Pharmacy in Our Changing Era ' Parts of the address follow

PHARMACY IN OUR CHANGING ERA

BY ROBERT P FISCHELIS

You must know the changing needs of humanity if you would succeed in life In business in your profession in your housekeeping, whatever your life that one thing is the secret of success You must first know the demand You must first know what people need, and then invest yourself where you are most needed Thus spoke Russell Conwell, the founder of this great University in his oft repeated lecture Acres of Diamonds "

At this convocation commemorating as it does the fiftieth anniversary of the beginning of Temple University and the thirty-third anniversary of the organization of its School of Pharmacy, it may profit us to spend a few minutes in contemplating the Conwell success formula as it applies to the field of endeavor in which we are engaged

How careful have we been to examine the changing needs of humanity with respect to pharmacy? Have we honestly and intelligently endeavored to ascertain what, among the things we have to offer, the people really need? Have we endeavored to invest ourselves where we are most needed? The answers to these questions will reveal how closely we have approached the standards of success as visualized by the founder of this University

We know that the demand for the type of pharmaceutical service which engaged the major part of the retail druggist s attention is no longer demanded to the extent that it was when Temple University organized its School of Pharmacy in 1901

Prescription work has not increased New and more complicated products have replaced the simple drugs in the physician's armamentarium The manufacturing function has been almost entirely eliminated from many of our retail drug stores This is partly due to the necessity for proper chemical and biological control of manufacturing processes or of finished products, which cannot be carried out in the ordinary drug store laboratory It is also partly due to the prohibition era, during which it was made difficult and in some instances impossible for pharmacists to obtain alcohol for manufacturing purposes without endless record-keeping and official red tape Nor was it possible to compete with large-scale producers who were able to obtain specially denatured alcohol in quantities at greatly reduced prices free from the revenue tax It was also partly due to the growing apathy on the part of pharmacists toward professional work, and their avidity for any kind of merchandising activity which would help to keep their establishments going at a profit

During this same period 'big business' entered the field of medicine Pharmaceutical manufacturing establishments of long standing became the playthings of financiers Advantage was taken of the fact that anybody can enter the medicine manufacturing business in all states of this Union without meeting any requirements as to scientific or professional training or moral character Our inadequate food and drug laws made it possible for individuals and corporations to grow wealthy at the expense of citizens who take it for granted that whatever anyone may print or say over the radio about a medicine is true Patent and proprietary medicines whose formulas are unrevealed were forced in constantly increasing numbers upon the pharmacist s shelves by the creation of a public demand through advertising of one kind or another and by high-pressure sales methods Manufacturers of these products set themselves up as authorities on the diagnosis and treatment of nearly all ailments to which the human flesh is heir, and with the increasing costs of properly regulated, scientific medical care, they found a fertile field among those who considered the taking of medicine an economical way to health in the full faith that their Government would permit no fraud in a field of such great importance to the public welfare Without question, these interests have made inroads upon the practice of medicine and pharmacy, with doubtful benefit at best and in many cases, with considerable detriment to the public health

Big business" also entered the retail drug

field It emphasized the merchandising possibilities of every commodity and every service ever offered in retail drug stores Many pharmacists, seeing the material success that attended the efforts of these organizations deemed it expedient and wise to follow the lead of the corporation stores In many instances this left the pharmacist of the old school far behind in the procession toward business success wondering how long he might be expected to survive but doing virtually nothing to determine whether the new developments were really filling a public need or whether they were merely a form of exploitation of a gullible and long suffering public

How many pharmacists are competent to pass upon the conflicting 'scientific' claims of the many hundred so called antiseptics cosmetics patent medicines and sundries which are offered an unsuspecting public as health aids with little or no scientific or even practical background? Here indeed we have a public need which the properly educated pharmacist can fill with profit to himself as well to his clientele The people want to know the truth about drugs They obtain exaggerated versions from certain popular literature but these versions are at least as truthful as the advertising which has placed the products criticized among the best sellers of the offerings of the drug store and they have the advantage of warning the public to be on its guard against possible and probable fraud With increasing doubt of the value of drugs engendered in the public mind, the people will listen to and honor a pharmacist who has the courage to tell the truth, based upon knowledge and facts

Ali Hafed—in the Conwell lecture Acres of Diamonds"—traveled thousands of miles from his home in search of diamonds He died in poverty, but the man who bought Ali Hafed's original farm soon discovered the most perfect diamonds in the garden of the home which Ali had left to wander afar in his ill fated search How true of Pharmacy! We wandered far afield in search of material success, and we have left uncovered the acres of diamonds lying in our back yard because we seem to be unable to apply the training and knowledge we have gained at great expense of time and effort to the simple task of finding the human need which we are able to fill

But, you say, even if we should cooperate more intimately with the medical and dental professions and become an acknowledged source of critical information on the efficiency and value of drug products would this not lessen rather than increase our income? Certainly we could not be expected to continue to sell the articles which science condemns

It is true that a fairly general acceptance of a program of this kind would curtail the sale of many products, but it would correspondingly increase the sale of those which are marketed purely on a basis of merit Pharmacists would no longer hesitate to express their convictions on health matters and they would rise in public esteem to the level of a true health profession The utilization of the professional services of pharmacists to their fullest extent would fill a public need for which the public will pay and do so willingly and handsomely

We have tried many schemes to improve our condition Practically all of them have failed Is it not worth trying something which is based upon the fundamental reason for the existence of a profession of pharmacy?

If we are to have a strong, militant and effective profession of pharmacy in the future, we must have strong, efficient and forward-looking colleges of pharmacy We do not need as many as we have, and in the years immediately ahead we shall, no doubt, see a merging of some institutions with others and a complete cessation of activity in a number of these schools It is important in a transition period such as we are now going through that the profession keep a close check on the type of instruction offered in our colleges There is an unfortunate tendency in some universities to turn over the direction of schools of pharmacy to administrators who have no pharmaceutical background It is a mistake for any profession to entrust the destiny of the institutions which train its future personnel to administrators who have not themselves come up through the ranks of the profession Occasionally an able administrator will be found who though not a pharmacist can acquire a sufficient pharmaceutical background over a period of years to enable him to do a fairly good job in promoting pharmaceutical education In general however pharmacy schools which lack the administrative direction of a trained pharmacist do not turn out the best type of raw material needed for the up building of the profession

President Beury is to be congratulated upon

macy, Lloyd N Richardson, president Maryland Board of Pharmacy, John C Krantz, Jr, second vice president, Henry Brown, Executive Committee Penna Pharmaceutical Association, Charles T Pickett, secretary, Philadelphia Association Retail Druggists

Robert P Fischelis, president-elect of the AMERICAN PHARMACEUTICAL ASSOCIATION made the principal talk at the Pharmacy convocation Wednesday afternoon

A large number of guests, students and alumni listened to his scholarly paper 'Pharmacy in Our Changing Era' Parts of the address follow

PHARMACY IN OUR CHANGING ERA

BY ROBERT P FISCHELIS

You must know the changing needs of humanity if you would succeed in life In business in your profession in your housekeeping whatever your life that one thing is the secret of success You must first know the demand You must first know what people need and then invest yourself where you are most needed' Thus spoke Russell Conwell the founder of this great University in his oft-repeated lecture Acres of Diamonds'

At this convocation, commemorating as it does the fiftieth anniversary of the beginning of Temple University and the thirty-third anniversary of the organization of its School of Pharmacy, it may profit us to spend a few minutes in contemplating the Conwell success formula as it applies to the field of endeavor in which we are engaged

How careful have we been to examine the changing needs of humanity with respect to pharmacy? Have we honestly and intelligently endeavored to ascertain what, among the things we have to offer, the people really need? Have we endeavored to invest ourselves where we are most needed? The answers to these questions will reveal how closely we have approached the standards of success as visualized by the founder of this University

We know that the demand for the type of pharmaceutical service which engaged the major part of the retail druggist s attention is no longer demanded to the extent that it was when Temple University organized its School of Pharmacy in 1901

Prescription work has not increased New and more complicated products have replaced the simple drugs in the physician's armamentarium The manufacturing function has been almost entirely eliminated from many of our retail drug stores This is partly due to the necessity for proper chemical and biological control of manufacturing processes or of finished products, which cannot be carried out in the ordinary drug store laboratory It is also partly due to the prohibition era, during which it was made difficult and in some instances impossible for pharmacists to obtain alcohol for manufacturing purposes without endless record keeping and official red tape Nor was it possible to compete with large scale producers who were able to obtain specially denatured alcohol in quantities at greatly reduced prices free from the revenue tax It was also partly due to the growing apathy on the part of pharmacists toward professional work, and their avidity for any kind of merchandising activity which would help to keep their establishments going at a profit

During this same period big business' entered the field of medicine Pharmaceutical manufacturing establishments of long standing became the playthings of financiers Advantage was taken of the fact that anybody can enter the medicine manufacturing business in all states of this Union without meeting any requirements as to scientific or professional training or moral character Our inadequate food and drug laws made it possible for individuals and corporations to grow wealthy at the expense of citizens who take it for granted that whatever anyone may print or say over the radio about a medicine is true Patent and proprietary medicines whose formulas are unrevealed were forced in constantly increasing numbers upon the pharmacist's shelves by the creation of a public demand through advertising of one kind or another and by high pressure sales methods Manufacturers of these products set themselves up as authorities on the diagnosis and treatment of nearly all ailments to which the human flesh is heir, and with the increasing costs of properly regulated, scientific medical care, they found a fertile field among those who considered the taking of medicine an economical way to health in the full faith that their Government would permit no fraud in a field of such great importance to the public welfare Without question, these interests have made inroads upon the practice of medicine and pharmacy, with doubtful benefit at best, and in many cases, with considerable detriment to the public health

'Big business" also entered the retail drug

field It emphasized the merchandising possibilities of every commodity and every service ever offered in retail drug stores Many pharmacists, seeing the material success that attended the efforts of these organizations, deemed it expedient and wise to follow the lead of the corporation stores In many instances this left the pharmacist of the old school far behind in the procession toward business success, wondering how long he might be expected to survive, but doing virtually nothing to determine whether the new developments were really filling a public need or whether they were merely a form of exploitation of a gullible and long-suffering public

How many pharmacists are competent to pass upon the conflicting 'scientific' claims of the many hundred so called antiseptics cosmetics, patent medicines and sundries which are offered an unsuspecting public as health aids with little or no scientific or even practical background? Here indeed we have a public need which the properly educated pharmacist can fill with profit to himself as well to his clientele The people want to know the truth about drugs They obtain exaggerated versions from certain popular literature but these versions are at least as truthful as the advertising which has placed the products criticized among the best sellers of the offerings of the drug store and they have the advantage of warning the public to be on its guard against possible and probable fraud With increasing doubt of the value of drugs engendered in the public mind, the people will listen to and honor a pharmacist who has the courage to tell the truth based upon knowledge and facts

Ali Hafed—in the Conwell lecture 'Acres of Diamonds'—traveled thousands of miles from his home in search of diamonds He died in poverty, but the man who bought Ali Hafed's original farm soon discovered the most perfect diamonds in the garden of the home which Ali had left to wander afar in his ill fated search How true of Pharmacy! We wandered far afield in search of material success, and we have left uncovered the acres of diamonds lying in our back yard because we seem to be unable to apply the training and knowledge we have gained at great expense of time and effort to the simple task of finding the human need which we are able to fill

But you say, even if we should cooperate more intimately with the medical and dental professions and become an acknowledged source of critical information on the efficiency and value of drug products would this not lessen rather than increase our income? Certainly we could not be expected to continue to sell the articles which science condemns

It is true that a fairly general acceptance of a program of this kind would curtail the sale of many products, but it would correspondingly increase the sale of those which are marketed purely on a basis of merit Pharmacists would no longer hesitate to express their convictions on health matters and they would rise in public esteem to the level of a true health profession The utilization of the professional services of pharmacists to their fullest extent would fill a public need for which the public will pay and do so willingly and handsomely

We have tried many schemes to improve our condition Practically all of them have failed Is it not worth trying something which is based upon the fundamental reason for the existence of a profession of pharmacy?

If we are to have a strong militant and effective profession of pharmacy in the future we must have strong, efficient and forward-looking colleges of pharmacy We do not need as many as we have and in the years immediately ahead we shall, no doubt see a merging of some institutions with others and a complete cessation of activity in a number of these schools It is important in a transition period such as we are now going through that the profession keep a close check on the type of instruction offered in our colleges There is an unfortunate tendency in some universities to turn over the direction of schools of pharmacy to administrators who have no pharmaceutical background It is a mistake for any profession to entrust the destiny of the institutions which train its future personnel to administrators who have not themselves come up through the ranks of the profession Occasionally an able administrator will be found who though not a pharmacist, can acquire a sufficient pharmaceutical background over a period of years to enable him to do a fairly good job in promoting pharmaceutical education In general however, pharmacy schools which lack the administrative direction of a trained pharmacist do not turn out the best type of raw material needed for the up building of the profession

President Beury is to be congratulated upon

having followed the Conwell formula of looking for the diamonds in your own home ground, when selecting as the Dean of your Pharmacy School, to succeed the late Dean Minehart a man who not only knows pharmacy from actual contact but whose services to the University over a long period of years have qualified him most admirably to lead this institution to newer and greater spheres of usefulness Dean Kendig s approach to the problem of educating pharmacists to meet the newer and broader responsibilities of the future has been both statesmanlike and practical I am glad to pay this tribute to the splendid efforts he is putting forth in your behalf

We have been spending much time in building up a national pharmaceutical curriculum based upon minimum hours required subjects and a cultural background The modern idea of university education is to lay less emphasis upon class work schedules and required attendance In the words of Woodrow Wilson The University spirit is intolerant of all things that put the human mind under restraint It is intolerant of everything that seeks to retard the advancement of ideas the acceptance of truth, the purification of life ' We still have a considerable road to travel to place pharmaceutical education on the level of the newer ideas for developing a liberal educational program The time is not far distant however when such a program must be given more serious consideration Graduate work in our colleges of pharmacy must be developed if we are to man state and national pharmaceutical associations colleges of pharmacy and boards of pharmacy with the kind of personnel that will develop our profession along lines of greater usefulness

Finally, it is incumbent upon those who have the management of our two great national associations in charge to give consideration to the possibility of merging their activities It is not necessary to merge the physical equipment and other assets of these associations in order to bring about a more coordinated program of activity There should, however, be a clearly defined line of activity which each of our national organizations should undertake and in which each of them should be considered the acknowledged leader Both organizations should place their entire resources back of the joint programs and should unselfishly assist each other in carrying their respective programs to a successful issue This is no time for petty quarrels There are too many big things at stake There is within the membership of these national organizations sufficient intelligence and ability to work out an effective plan of cooperation, and such a plan should be worked out without delay

Allowing to morrow to take care of itself is, in the long run, a destructive procedure We are suffering to day from the lack of foresight and constructive planning of the generation immediately preceding ours Let us not fall into the same error Let us also in the spirit of Russell Conwell, remember that Pharmacy is not a thing conceived to please pharmacists It is a thing with which pharmacists must please mankind in general

Left, C Lewis Diehl, *right*, William S Thompson, Washington, D C, president, A Ph A, 1884 (see page 83, February) on Mississippi steamer, St Louis 1901 See historical paper by John E Kramer in this issue of the JOURNAL

NOTICE TO RESEARCH WORKERS IN PHARMACY

The Annual Census of Pharmaceutical Research under the auspices of the National Conference on Pharmaceutical Research is being compiled All reports must be sent promptly to Dr James C Munch 40 North Maple Avenue Lansdowne Pa in order to be included in this year s census Census blanks may be obtained by writing the office of the *Secretary* 2411 North Charles Street Baltimore, Maryland

EDITORIAL NOTES

DONATION OF MORTARS

Dr Γ B Tipton, of Washington has do nated two mortars and pestles, one a lignum vitæ and the other of bell metal which has an interesting recorded history It was brought to this country from England by Captain Dr William Stone, November 22 1633 who landed in Maryland March 25 1634 He obtained the mortar and pestle from his father in 1622 The former was Governor of Mary land from August 6, 1648 to July 20 1654 The history is complete up to the present day— Dr Tipton received the mortar from Robert Pinkney Stone on March 16 1931 and it was donated to the AMERICAN PHARMACEUTICAL ASSOCIATION by the former on March 16 1934

A COOPERATIVE MOVE

The regularly licensed and registered prac titioners of Medicine Dentistry and Pharmacy of Kansas have formed an organization to bring about professional cooperation and en hance the well being of the public It is known as The Public Health Council of Kansas "

LANDMARKS SOCIETY OF ALEXAN DRIA TO RESTORE THE STABLER PHARMACY

A charter for a non stock corporation has been applied for under the new name of Land marks Society It was also voted unani mously to restore the building as far as possible to the condition of 1792, using the material recently discovered in the attic of the old Stabler store for this purpose From the opinions of the architects that have been consulted this restoration of the 1792 condi tions appears to be well endorsed It seems certain however that it cannot be completed in time for exhibition in May The Lead beater (Stabler) Apothecary was recently acquired for the AMERICAN PHARMACEUTICAL ASSOCIATION

PERSONAL AND NEWS ITEMS

Under direction of Chairman **Anton Hogstad, Jr**, of the Pharmacy Week Committee Okla homa Pharmaceutical Association will have an exhibit of a Modern Pharmacy patterned after that held by Wisconsin Pharmaceutical Association

Dr Henry S Johnson, of Connecticut College, College of Pharmacy is giving a series of lectures on pharmacy and pharmaceutical preparations to the students in Yale University School of Medicine in connection with their course in pharmacology These lectures are being given at the invitation of Dr Henry G Barbour Head of the Department of Pharma cology in the School of Medicine Dr John son is being assisted in his work by Prof Fuller and Mr Fenney of the Pharmacy De partment of the Connecticut College of Pharmacy

Dr Edward Kremers delivered the principal address at the celebration of the 50th anniver sary of the founding of the School of Pharmacy, Purdue University The subject of his address was Pharmaceuticals in the United States as Influenced by the Universities of the Old Northwest Territory '

Secretary **J Lester Hayman** advises that the campaign in West Virginia has resulted in an increase of $33^1/_3\%$ of membership of the State association

Dr Paul N Leech, director of the American Medical Association Laboratories in Chicago delivered two lectures before Purdue University section of the American Chemical Society In his first lecture Dr Leech discussed cos metics antiseptics and proposed food and drug legislation (Copeland bill) He stated that the American Medical Association indorses the intention of the Copeland bill but that he personally felt it would be better to amend the old bill than to introduce an entirely new one, inasmuch as the old Act has been tested by numerous Supreme Court decisions

In his second lecture Dr Leech discussed late developments in the drug field

Prof Heber W Younken recently was expert witness in a case involving the respon sibility for two deaths The determination was based on his testimony following micro scopical examination of adhering particles to the bullets that caused the deaths

On February 28th the Board of Trustees of The Tennessee Academy of Science unani mously elected **Dr A Richard Bliss, Jr,** director of The Reelfoot Lake Biological Station at Reelfoot Lake, Tennessee

SOCIETIES AND COLLEGES

TRANSPORTATION TO THE WASHINGTON MEETING WEEK OF MAY 7TH

Chairman Theodore J Bradley of the Transportation Committee and E F Kelly secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION have been advised by the various passenger associations that the identification ticket plan concession of $1\frac{1}{3}$ fare for the round trip has been allowed Identification certificates will be sent out later to members and those contemplating the trip should see their passenger agents as promptly as possible so that there will be no question when purchase of tickets is made The tickets are good *via* the same route in both directions and will be sold from April 28th to May 9th, inclusive and before being honored for return, return portions of the tickets must be validated at Washington or Baltimore The tickets include thirty days in addition to date of sale and validated tickets will be good for return leaving on any day within final limit

Round trip tickets will also be sold on the $1\frac{1}{3}$ fare basis going *via* any authorized route published in one way tariffs returning *via* any other authorized route published in one way tariffs

It will be necessary for members when purchasing round trip tickets to present and surrender the identification ticket issued account of the meeting and to indicate to ticket agents which ticket is desired namely, (1) $1\frac{1}{3}$ fare for round trip good for same route in both directions, final return limit thirty days in addition to date of sale (2) $1\frac{1}{3}$ fare for round trip going *via* any authorized route and returning *via* another authorized route In both cases the final return limit is thirty days in addition to date of sale

The identification certificates will bear the signature of E F Kelly, secretary of the A PH A and will be mailed to members very soon

PAPERS FOR THE SECTIONS AND CONFERENCES

Members who will present papers at the Washington meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION should send them in promptly to the Section officers, carbon copies may be sent to the Editor of the JOURNAL A PH A, 2215 Constitution Ave, Washington D C

The Scientific Section has issued the following call

Members and Friends of the Scientific Section, American Pharmaceutical Association

The 82nd annual meeting will be held in Washington D C, during the week of May 7th and will include the dedication of the new headquarters building The Scientific Section plans to hold several interesting sessions but in order to accomplish this the officers must have your cooperation

Since the Convention date is much earlier than usual and now is only about six weeks away, it will be necessary for authors of papers to submit titles and very short abstracts to the Secretary by April 15th at the very latest in order that the titles may appear in the printed program Authors should indicate whether the papers are to be presented in person or by title and should bear in mind that ten minutes is the time limit for the presentation of a paper

F E BIBBINS, *Chairman*, Scientific Section

L E ROWE, *Sec'y*, Scientific Section, c/o Parke, Davis & Co Detroit, Michigan

The Scientific Section has received the following papers

1 The Effect of Hydrogen Peroxide and Some Oxygenated Terpenes upon Ascaris Lumbricoides," L W Butz and W A La Lande, Jr

2 'A New Method for Determining Acetyl Salicylic Acid in the Presence of Other Medicinal Products," R M Hitchens

3 "The Stabilization of Syrup of Ferrous Iodide U S P X," William J Husa and Lyell J Klotz

4 "Drug Extraction I A Study of Various Manstrua from the Standpoint of Swelling Effects, Penetration and Extraction," William J Husa and Louis Magid

5 'Drug Extraction II The Effect of Fineness of Powder and of Variation in Solvents on the Percolation of Belladonna Root," William J Husa and C L Huyck

6 'Drug Extraction III The Function of Preliminary Maceration in Relation to the Percolation of Belladonna Root," William J Husa and S B Yates

7 "Drug Extraction IV The Effect of Variation in Solvents on the Extraction of Jalap" William J Husa and Faul Fehder

Section Officers

Scientific Section—*Chairman* F E Bibbins, 5840 Washington Blvd, Indianapolis Ind, *First Vice Chairman* E V Lynn Seattle, Wash, *Second Vice Chairman* H M Burlage, Chapel Hill, N C, *Secretary* L W Rowe % Parke, Davis & Co, Detroit Mich, *Delegate to the House of Delegates* W J Husa, Gainesville, Fla

Section on Education and Legislation—*Chairman* George C Schicks Montclair, N J, *Vice-Chairman* Oscar E Russell Elkhart, Ind *Secretary* C W Ballard Mount Vernon N Y *Delegate to House of Delegates* W H Rivard Providence R I

Section on Practical Pharmacy and Dispensing—*Chairman* M J Andrews, University of Maryland Lombard and Greene Sts, Baltimore Md *Vice-Chairman* Ralph W Clark, University of Wisconsin, Madison Wis, *Secretary*, R E Terry School of Pharmacy, University of Illinois 701 S Wood St Chicago, Ill *Delegate to the House of Delegates* L W Rising Newark N J

Section on Commercial Interests—*Chairman*, John A J Funk Galveston Ind *Vice Chairman*, Henry Brown Scranton Pa *Secretary*, Robert W Rodman 55 Park Ave, Bloomfield N J *Delegate to the House of Delegates* R B Rothrock Evansville Ind

Section of Historical Pharmacy—*Chairman* Louis Gershenfeld, 281 S 63rd St Philadelphia, Pa, *Secretary* C O Lee Purdue University, Lafayette, Ind, *Delegate to the House of Delegates* J T Lloyd, Cincinnati Ohio *Historian*, E G Eberle 2215 Constitution Ave Washington D C

Conferences

National Conference on Pharmaceutical Research—*Chairman* E N Gathercoal, Chicago *Vice Chairman*, William J Husa, Gainesville Fla *Secretary* John C Krantz, Jr Baltimore *Treasurer*, Fitzgerald Dunning Baltimore, *Executive Committee* H V Arny, Montclair N J R L Swain Baltimore F C Bibbins, Indianapolis

Conference Pharmaceutical Association Secretaries—*President*, Robert C Wilson University of Georgia, Athens Ga, *First Vice President*, F B McCullough, New Albany Ind, *Second Vice-President*, E R Weaver Stillwater Okla, *Secretary Treasurer*, Carl G A Harring 20 Glen Road Newton Center Mass *Delegate to the House of Delegates* Wm B Day, Chicago, Ill *Members of the Executive Committee*, J Lester Hayman, Morgantown, W Va, J J Gill, Providence, R I, Roy Reese, Topeka, Kans, W E Bingham, Tuscaloosa, Ala

Conference of Pharmaceutical Law Enforcement Officials—*Chairman* R L Swain, 2411 No Charles St Baltimore, Md, *Secretary-Treasurer*, N N Ford New State Office Building Room G 18 Columbus, Ohio *Delegate to the House of Delegates* Fred Schaefer Brooklyn N Y

Plant Science Seminar—*Chairman*, Frank H Eby, 240 Powell Road, Springfield Pa, *Vice Chairman*, L K Darbaker, 424 Franklin Ave Wilkensburg, Pa, *Secretary Treasurer*, F J Bacon, Western Reserve University, Cleveland, Ohio, *Executive Committee* C E F Mollett, Montana E B Fisher, Minnesota

PHARMACY EXTENSION DEPARTMENT, PURDUE UNIVERSITY

The fourth annual Druggists' Business Conference was held at Purdue University, March 20th The occasion had added interest in the celebration of the semi centennial of the school of pharmacy Editor Jerry McQuade and Harry S Noel delivered addresses Al Fritz, of Indianapolis, discussed the present drug codes Other speakers were Ray Whidden and Secretary Frank V McCullough who discussed legislation in Indiana

The semi-centennial celebration was held following the conclusion of the Business Conference at which time the principal speaker was Dr Edward Kremers of Wisconsin The meeting closed with a banquet

KANSAS PHARMACEUTICAL ASSOCIATION

Kansas Pharmaceutical Association will hold its annual sessions in Salina April 10th–12th Among the speakers will be Dr Frank Kirby secretary of the Pharmacy Exhibit at the World's Fair in Chicago, his subject will be "Detailing for Prescriptions" As part of the program the Sayre Club will have a memorial meeting in honor of the late L E Sayre

Election of officers of the Association is by mail ballot

PENNSYLVANIA BOARD OF PHARMACY EXAMINATIONS

Examination for applicants desiring registration as Pharmacist will be conducted in the Philadelphia College of Pharmacy 43rd Street and Kingsessing Avenue Philadelphia and

the Pittsburgh College of Pharmacy, 1431 Boulevard of the Allies Pittsburgh on Thursday and Friday April 5 and 6, 1934

Assistant Pharmacist Examination—In the Philadelphia College of Pharmacy 43rd Street and Kingsessing Avenue, Philadelphia, and the Pittsburgh College of Pharmacy, 1431 Boulevard of the Allies on Saturday April 7, 1934, 9 00 to 4 00 o clock

OKLAHOMA UNIVERSITY PHARMACEUTICAL ASSOCIATION

The first annual convention of Oklahoma University Pharmaceutical Association was held March 9th in the Pharmacy Building, Norman Okla An interesting program, including all divisions of pharmacy was carried out Scientific Section Section on Practical Pharmacy and Dispensing Section on Commercial Interests Section on Historical Pharmacy In each of these divisions instructive papers were read and discussed

AMERICAN DRUG MANUFACTURERS' ASSOCIATION

The American Drug Manufacturers' Association will hold its twenty third annual convention at the Greenbrier, White Sulphur Springs, W Va, April 16th to 19th The scientific and biological sections have prepared an interesting program including among other subjects concerning alkaloid and drug standards analytical assay methods chemical tests and standards crude and milled drugs, digestive forms and glandular products drug extracts, pharmaceutical investigations

The chairman of the Committee on Alkaloid and Drug Standards, F O Taylor, has been studying some methods of tests now used in the Pharmacopœia which are open to criticism in one way or another The Biological Section has arranged a program which will have as a feature an address by Dr George W McCoy

DISTRICT MEETINGS

District No 1 Board and College members held its annual meeting at the Massachusetts College of Pharmacy on March 14th–15th

A very interesting and profitable meeting of the Boards of Pharmacy and the Colleges of Pharmacy in District No 2, including New York Pennsylvania New Jersey Delaware District of Columbia and Maryland was held at Hotel Emerson, March 12th to 13th There was a very good representation from the several states An address on "The Relation of Pharmacy to Public Health" was made by Dr Huntington Williams, Commissioner of Health of Baltimore City The Baltimore Branch of the A Ph A took an active part in the meeting which will be reported with that of the Branch

A general meeting of members of the bodies of District No 7, comprising Georgia, Florida Alabama, Mississippi, Louisiana Porto Rico, was held March 26th–27th in St Petersburg Florida The chairman for the Colleges was Wm J Husa for the Boards Charles H Evans

Among the questions discussed were the following Standardization of Experience," Accuracy of Prescription Filling" from the teaching standpoint and from the enforcement standpoint Minimum Standards of Technical Equipment for Drug Stores ' 'Various Branches of Teaching and the Subjects to Be Taught " ' The Nature of Board Examination Questions and Reciprocity " Legislation of various phases relating to the drug industry was discussed

CONNECTICUT COLLEGE OF PHARMACY ESTABLISHES SCHOLARSHIPS

Announcement has been made by the Connecticut College of Pharmacy that four scholarships, the total value of which is about $1000 will be awarded next September to graduates of high and secondary schools of Connecticut

MID-WINTER MEETING, NEW JERSEY PHARMACEUTICAL ASSOCIATION

The mid winter meeting of New Jersey Pharmaceutical Association was held in Trenton, N J, March 8th at which time matters affecting legislation and concerned with the codes were discussed

The New Jersey Pharmaceutical Association and its Retail Drug Trade Alliance, have been working on a state code which has been presented to the legislature There are pending in the legislature also bills affecting the practice of pharmacy and provision to investigate business methods and practice of chain and cut rate" drug stores in New Jersey

The New Jersey Board of Pharmacy will hold examinations for applicants for the Registered Pharmacist certificate at the State House New Jersey on April 19th

NEW ENGLAND DRUG SHOW

The New England Drug Show will be held at Mechanics Building in Boston during the week of April 2nd At this time the annual spring conference of New England druggists will be held

HISTORICAL EXHIBIT IN NEW BRUNSWICK HOSPITAL

An interesting exhibit was arranged in St Peter's Hospital, New Brunswick, N J The exhibit depicted the history of the institution by charts photographs and statistical data

A pathological and clinical laboratory was installed in 1920 In 1921 Dr and Mrs F B Kilmer founded a nurses library of more than 2000 volumes in memory of their son Joyce Kilmer killed in the World War Dr Kilmer has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION for nearly a half century

OLD APOTHECARY GLASSWARE

Liebig s laboratory at Giessen once internationally famous as a center of chemical instruction, has been converted into a museum housing exhibits illustrative and commemorative of the great scientist's many activities and interests The pharmaceutical section is quite prominent The museum is administered by a corporation, Gesellschaft Liebigmuseum, and its moving spirit is Prof Robert Sommer of the medical school, who is largely responsible for the salvation of the old laboratory building for museum purposes, and to him also is due the credit for the untiring devotion entailed in collecting the interesting material on view

The museum has a collection of glassware, reproductions typical of the Apothecary shop known to Liebig Arrangements have been made for the reproductions by the Gesellschaft Liebigmuseum at Giesen These bottles lend a charming and distinctive note to a pharmacy and may be obtained from the society mentioned

LEGAL AND LEGISLATIVE

CALIFORNIA FAIR TRADE ACT CONSTITUTIONAL

Provision added by 1933 legislature, prohibiting "Unwholesome and Predatory Practices in the Merchandising of Goods, ' was upheld and defendant enjoined from selling below firm price fixed by distributor

That section $1^1/_2$ of the California Fair Trade Act, added by the 1933 Legislature (Statutes of 1933, page 793) which forbids any person from wilfully and knowingly advertising offering for sale or selling any commodity at less than the price stipulated in any contract entered into pursuant to the provisions of Section 1 of this Act whether the person so advertising offering for sale or selling is or is not a party to such contract is unfair competition and is actionable at the suit of any person aggrieved—is constitutional has been held by Judge Timothy I Fitzpatrick of the Superior Court of the City and County of San Francisco, Department 8, in the case of Weco Products Co of California *vs* Sunset Cut Rate Drug Co *et al*, decided January 24, 1934

NATIONAL RECOVERY ADMINISTRATION

A committee of twelve members representing the distribution and consumers service trade, similar in purpose to the two industrial committees named during the recent Code Authority Conference, was announced on March 14th by National Reconstruction Administrator Hugh S Johnson This committee has been at work during the week and will advise the Administrator on various problems The committee is headed by Rivers Peterson *chairman* of National Retail Code Authority The committee is composed as follows (1) Retail consisting of four members The retail drug industry is represented by Secretary E F Kelly of the A PH A, who is also secretary of the National Retail Drug Code Authority (2) Wholesale, composed of four members The wholesale drug industry is represented by E L Newcomb executive vice-president of the National Wholesale Druggists' Association The consumers' service also has four members

It is the intention of the committee to make a real contribution toward effecting all of the twelve points outlined in General Johnson s speech to the Code Authority Meeting

THE AMENDED COPELAND BILL

S 2800—Mr Copeland of N Y To prevent the manufacture shipment and sale of adulterated or misbranded food drink, drugs

and cosmetics, and to regulate traffic therein, etc , reported from committee on March 15th, the bill has been amended in a number of sections

The labeling requirement for drugs used as a palliative for specific diseases has been changed to require that the nature of the palliative action of the drug rather than its palliative effect be shown on the label The paragraph, providing that advertisements of drugs represented to have any effect in the treatment of a list of some forty diseases are presumed to be false is striken out For the purpose of consultation in formulating general administrative policies for the enforcement of the bill there is authority for the secretary to appoint advisory committees from the food, drug, cosmetic and advertising trades and from the public

New sections added to paragraphs dealing with injunction proceedings would provide that as a means for avoiding multiplicity of libel for condemnation proceedings the federal district courts would have authority to restrain by injunction the institution of more than one seizure action against any product (1) if the alleged violation is of misbranding only (2) if all current shipments bear the same labeling (3) if the alleged misbranding does not involve danger to health or gross deception, and (4) has not been the basis of a prior judgment in favor of the United States in any criminal prosecution for libel under the bill The date when the bill is to become effective is made twelve months from its enactment into law instead of six months Upon approval by the President, the Secretary of Agriculture is to designate foods having common or usual names and exempt them from the labeling provisions of the bill for a reasonable time to permit formulation, promulgation and application of definitions and standards of identity therefor — Status Reported by S Com on Commerce, 3–15–34

According to press reports Arthur D Whiteside, brought into NRA by General Johnson as administrator has vacated his Washington quarters and returned to New York to resume his place as president of Dun & Bradstreet

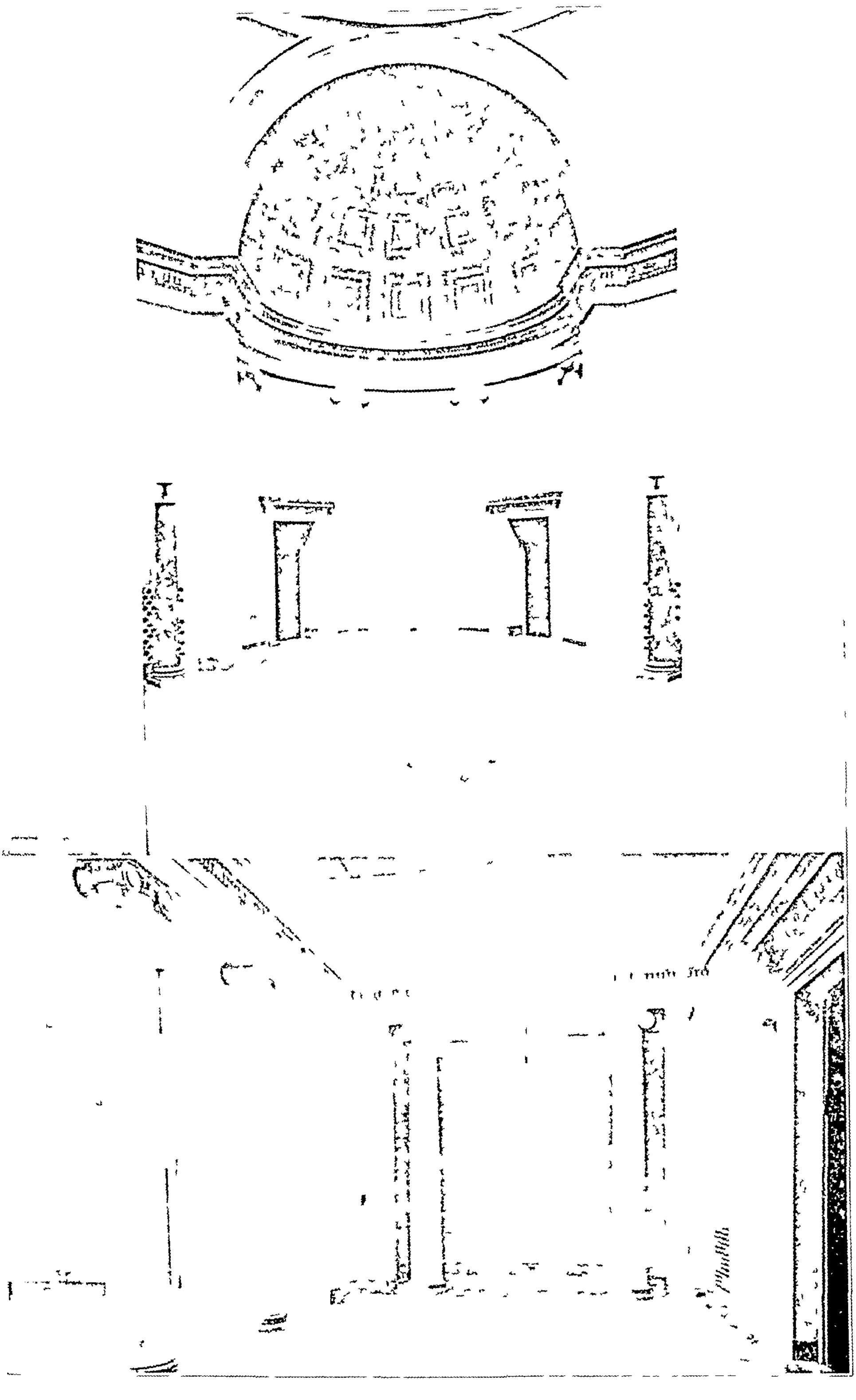
BOOK NOTICES AND REVIEWS

The Chemical Formulary distributed by the Chemical Formulary Company, Bush Terminal Building No 5 Brooklyn N Y 600 pages Price $6 00 The Board of Editors consists of about sixty contributors

The Formulary contains methods for making varieties of face and skin creams toilet preparations including lotions, shampoos, hair preparations tooth powders and pastes perfumes, bleaches deodorants, etc Other lists include anti freezes adhesives beverages blacking, cleaners colors, crayons, driers, drycleaning soap, dyes embalming fluid, emulsions enamel, explosives, extracts fillers, fire-proofings, foams, food specialties, fuel glazes, glue, incense, insecticides, ink, lacquer latex, leather, liniments liquor lubricants moth exterminators mildew proofing mouth wash, paint, pigments, plastics, plating polish, preservatives rat-poison rubber goods rust proofing, shoe cleaners soaps solvents styptics, varnish viscose, waterproofing wax, synthetic wax polish weed killer, wood filler, etc

The publishers state that many of the formulas are used commercially, others are taken from patent specifications publications and other sources with the end in view of supplying dependable information The value of formulas depends largely on whether practical and satisfactory application has been made of them how far this has been done the reviewer is not in position to say There is lack of uniformity in the publication of formulas in abbreviations, capitalizing in giving quantities etc This may not detract from the value of the formulas but it is noticeable, thus, under 'Removing Stains—Chromic Compounds Chromates Sod Bisulphite or Sod Hyposulphite and dilute sulphuric acid" Lead Compounds — Stain with Tinc Iodine, dry and dissolve with concentrated pot iodide solution'

Quantities are given in different weights and measures, in parts, in percentages and without designation, such variations occur on the same page A heading reads 'Stone, Artificial," the one following, Synthetic Stone" In a formula there are the following abbreviations compn" for composition, "prepd" for prepared 'HCl" the strength is not given As heretofore stated, these defects may have no bearing on the value of a formula Some of the formulas are indefinite, but no attempt has been made to check up on ingredients and quantities and the resulting product, it is assumed the publishers have endeavored to present formulas that are reliable However, in the opinion of the writer, the value of "The Chemical Formulary' is not enhanced by the inclusion in some formulas of certain advertised specialties without naming the constituents



F g The E v and Alc v f th Am n In titut f Phamacy P l w Th Mu eum

SIR HENRY S WELLCOME

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII APRIL 1934 No 4

THE REMINGTON HONOR MEDALIST FOR 1934

Sir Henry S Wellcome, of London, England, is the Remington Medalist for 1934 and the formal award will be made during the week of May 7th in Washington He is a native of Wisconsin, later the family moved to Minnesota where he received his early pharmaceutical training under an English chemist, manager of pharmacy in Garden City, thereafter the young man was placed in charge of the dispensing department of a pharmacy in Rochester, Minn After several years of experience, he engaged with the late Thomas Whitfield, Chicago, and attended the Chicago College of Pharmacy, in the year following he matriculated at the Philadelphia College of Pharmacy and graduated in 1874, being a classmate of Dr Frederick B Power [1] Influential factors in the beginnings of many of Mr Wellcome's activities are referred to in the July number, 1925, of the JOURNAL, and others are noted in this sketch

His interest in ethnological and archeological subjects had its inception in days of his frontier life and has found expression in his large undertakings and many activities, his analytical mind and powers of observation are always linked with a purpose to be of service

In 1879, Mr Wellcome visited South America and made a survey of the indigenous cinchona forests and reported the results of his investigations to the AMERICAN PHARMACEUTICAL ASSOCIATION, printed in its PROCEEDINGS, volume 27

In 1887, he published "The Story of Metlakahtla," which relates to a tribe of Indians in Alaska, transformed from savagery into peaceful, industrious citizens through education and adoption of Christianity, under the leadership of William Duncan, a missionary

Professor G A Reisner, distinguished archeologist of Harvard University, writing of Sir Henry's excavations in the Upper Nile region, said "The excavations carried on by Henry Wellcome have thrown unexpected light on early Ethiopian history in this region [2]"

[1] See Volume XI, JOUR A PH A (1922), 403

[2] The extent of these archeological diggings may be gathered from the employment of twenty-five members of the Administration staff and 3000 native workmen

Sir Henry's American interests are wide and varied In 1910, when there was a strong probability of cutting down appropriations for the work of General Gorgas, it was the former's interest and valuation of tropical research that influenced the Government's continued and larger support of this important work He is a director of the Gorgas Memorial Institute which operates scientific laboratories in Panama for research work touching cause and prevention of tropical diseases He has established and coordinated under separate and distinct direction—The Wellcome Bureau of Scientific Research, London (1913), the Museum of Medical Science (including Tropical Medicine and Hygiene) (1914), the auxiliary Entomological Research Laboratory at Clarementon, Esher, Subrey, England (1915), the Wellcome Tropical Research Laboratories at the Gordon Memorial College, Khartoum, Anglo-Egyptian Sudan, Upper Nile, Africa (1901), and the fully equipped auxiliary Floating Tropical Research Laboratory on the Upper Nile, and its tributaries (1906)

Sir Henry has received world-wide recognition for his outstanding services to science and medicine, for his interest in missionary enterprises, for his personal work in medical research, the history of medicine and pharmacy Apart from the research and experimental laboratories of the establishments of Burroughs Wellcome & Co , the following are some of his many enterprises

' The Wellcome Physiological Research Laboratories," London (1894), "The Wellcome Chemical Research Laboratories," London (1896), "The Wellcome Historical Museum," London (1913) In November of 1931, in London, the cornerstone was laid for "The Wellcome Research Institution," required for coordinating and extending the activities of the Wellcome chemical and medical research laboratories and museums

Knighthood was conferred on Dr Wellcome by King George V in 1932, in recognition of his life-work and generous support of medical research He is an Honorary Fellow of the Royal College of Surgeons, fellow of the Royal Society, of the Royal Society of Medicine, of the Royal Society of Tropical Medicine and Hygiene, London, Honorary Corresponding Doctor of the Ancient College of Medicine, Madrid, etc In 1865, he was awarded the Royal Humane Society Medal for life-saving, in 1928 the University of Edinburgh conferred on him the honorary degree of Doctor of Laws He is a member of many clubs in Great Britain and of a number in the United States—Lotus Club, New York, Cosmos Club, Washington, etc

Mr Wellcome became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1875, and has always taken an active interest in its work, in 1931, he was elected honorary president of the ASSOCIATION Very early in the campaign for the establishment of the Headquarters he took an active part in the project evidenced by words and deeds

---

Dedication ceremonies are scheduled for Wednesday morning, May 9th The banquet and all other meetings of the Annual Convention will be held at the Shoreham, the headquarters hotel

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

PHARMACY IN HOSPITALS

THE practice of pharmacy since it affects the public health should be regulated in the public interest and restricted to those who have been trained and licensed for this responsible work after their fitness has been proved through examination by a state agency The AMERICAN PHARMACEUTICAL ASSOCIATION has consistently worked to put this principle into practice and to throw every protection, possible of application, around the practice of pharmacy and around the use of drugs, medicines and medical supplies by the people A very important step in this program has just been taken and one which will have a splendid effect as it comes into general application

The American Medical Association, through its Council on Medical Education and Hospitals, maintains a list of recognized hospitals and related institutions One issue of its *Journal* is known as the Hospital Number" and is devoted to information about hospitals and related institutions and to the list of registered hospitals The "Hospital Number for 1934 was issued on March 31st

In the course of its work, the Council on Medical Education and Hospitals has prepared a number of ' Essentials of a Registered Hospital" and admits annually to its Hospital Register only those that are found to qualify according to these essentials The Council disclaims any legal authority over a hospital and recognizes clearly the right of those responsible for a hospital to conduct it as may seem wise to them It does require of a hospital or related institution, desiring to have its name appear on the Hospital Register, that it be willing to comply with the principles considered necessary for such endorsement Undoubtedly this procedure has been effective in raising the standards of these institutions In connection with the Essentials, the statement is made that "It is the desire of the Council to cooperate in every way for the improvement of hospital service, whereby the sick and injured may be provided with scientific and ethical medical care "

After a careful consideration of the practice of pharmacy in hospitals, the AMERICAN PHARMACEUTICAL ASSOCIATION decided that the first step toward the improvement of the pharmaceutical service was to request the inclusion among the "Essentials of a Registered Hospital" of one dealing with pharmacy The Council on Medical Education and Hospitals approved this request, and among the Essentials as published in the recent "Hospital Number" is the following "5 Pharmacy The handling of drugs should be adequately supervised and should comply with state laws " Although this requirement is not as specific as it should be, it is a distinct recognition of the place of pharmacy in the hospital, represents a step in the right direction and, no doubt, will be amplified as experience is gained in its application

With this requirement as a basis, the Boards of Pharmacy, and other institutions concerned should give hospital authorities every cooperation in making it as effective as conditions render possible Pharmacists and their organizations should concern themselves to see that the pharmaceutical service in each hospital is adequate and that it complies with the requirements of the state laws If the

requirements of a hospital do not justify a pharmacy in charge of a pharmacist, arrangements should be made if they do not exist, for local service

The inclusion of this requirement is another indication of the cooperation which should exist among the public health professions The AMERICAN PHARMACEUTICAL ASSOCIATION wishes to record its appreciation of the action of the Council on Medical Education and Hospitals which it is believed will lead to a more effective pharmaceutical service in the hospitals of our country —E F K

PERIODS IN THE HISTORY OF THE NATIONAL FORMULARY AND ITS PRECEDENTS

THE New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION on April 9th celebrated the 50th Anniversary of the New York and Brooklyn Formulary, the precursor of the National Formulary The former was published by a joint committee of delegates from the College of Pharmacy of the City of New York, the New York German Apothecaries' Society and the Kings County Pharmaceutical Society and entered according to Act of Congress in 1884, by the bodies named, Charles F Schleussner, secretary of the Joint Committee, was present at the meeting held in celebration of the anniversary

Wilbur L Scoville, former chairman of the Committee on National Formulary, has prepared a history of the National Formulary for the ASSOCIATION, which he sketches under five divisions, including the earlier efforts to compile a formulary of unofficial preparations and the success of the New York and Brooklyn Formulary, he refers to the incorporation of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1888, and details the editions of the succeeding revisions of the Formulary The author has made an interesting and valuable contribution while recording pharmaceutical history

During the period prior to the organization of the AMERICAN PHARMACEUTICAL ASSOCIATION, the apothecaries perfected the methods of manufacturing the galenicals and other remedial agents on which they built up their reputation and patronage, as a result of the individual studies and variety of products under the same or related names the preparations differed widely in strength, appearance and flavor Attempts had been made to establish greater uniformity prior to the organization of the AMERICAN PHARMACEUTICAL ASSOCIATION, but the efforts of organized pharmacy were more successful and brought about greater improvements in dispensing

"The need for a standard formulary was among the earliest considerations of the ASSOCIATION" The first record of the movement was made in the transactions of the meeting held in Cincinnati, in 1854, when it was moved that "the unofficial formulæ communicated by Messrs Matthews of Buffalo, Cummings of Maine, and Meakim of New York and contained in the report of the executive committee be preserved by the Secretary with a view to publication when future similar publications accumulate sufficiently to justify it"

Mr Scoville comments—"It is interesting to note that the first idea of a formulary as representing preparations used by physicians has held throughout the years without deviation and still represents the ideal of the National Formulary"

During the years following the early report heretofore referred to, dissenting views obtained relative to elixirs and many heated arguments occurred at a number of annual meetings of the ASSOCIATION

Acting on the suggestion of J S Bendiner, of New York, the New York and Brooklyn Formulary was published by a joint committee of the College of Pharmacy of the City of New York, the German Apothecaries' Society of New York, and the Kings County Pharmaceutical Society The Formulary met with favor by physicians and the desire to serve was expressed when the publishers offered to transfer the copyright to the AMERICAN PHARMACEUTICAL ASSOCIATION so that a wider use of the Formulary might be developed and its purpose extended This acceptance necessitated that the ASSOCIATION be chartered and this was perfected in February of 1888, in Washington It may be noted here that all of the members of the committee on the National Formulary were retail pharmacists, except Charles Rice, a hospital pharmacist, and Professor P W Bedford This edition of the National Formulary was published in the volume of the PROCEEDINGS and also separately

No attempt is made in this comment to detail the history of the National Formulary, Chairman E N Gathercoal has reported on the progress of National Formulary VI at recent annual meetings of the A PH A , and historical records are published in each edition of the National Formulary

Quoting W L Scoville, a former chairman, "the primary question in National Formulary revision is, what preparations do the physicians wish to use, and no question is raised why they wish to use them The National Formulary makes no dispute concerning the physician's therapeutic judgment It recognizes his legal and ethical right to his own discriminating purpose, and merely aims to add the prestige of uniformity in composition and appearance and of pharmaceutical skill in compounding to the physician's desire " In medical and pharmaceutical practices the Pharmacopœia and the National Formulary serve important purposes in public health activities

Those who laid the foundations of the standards and of the AMERICAN PHARMACEUTICAL ASSOCIATION rendered valuable services to medicine, the public, pharmacy and the drug industry in its several divisions

---

The time and place for the 1934 meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION—Washington, May 7th to 12th—were selected to accord with the plans for dedicating the Headquarters Building The occupancy of this building which with other structures that may later be erected on the site will be known as the American Institute of Pharmacy, is one of the most important events in the long history of the ASSOCIATION and marks the successful completion of the most extensive and far-reaching effort the ASSOCIATION has undertaken

A cordial invitation is extended to our members, to every one who contributed to the Headquarters Building and others interested in the progress of Pharmacy, to attend the meeting, particularly the dedication on May 9th The earnest desire is that no one should fail to understand that the invitation is all-inclusive of those interested

SCIENTIFIC SECTION

THE HYPERGLYCEMIC ACTION OF FORTY AMINES *

BY ROBERT C ANDERSON AND K K CHEN

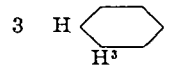
It is well known as a result of the work of Blum (1), Herter and Wakeman (2), Paton (3) and others that subcutaneous or intravenous injections of epinephrine are followed by a rise of blood sugar Hyperglycemia also occurs with the homologs of epinephrine, and with tyramine and ephedrine, as shown by Morita (4), Kageyama (5), Nagel (6) and Wilson (7) It seems that pressor substances generally raise blood sugar Nagel (6) has gone as far as to say that the elevation of the blood sugar content can be considered as a measure of the influence of a substance on the sympathetic nervous system

In previous communications, Chen, Wu and Henriksen (8), Swanson (9) and Chen and Chen (10) reported their study on a group of amines related to ephedrine and epinephrine, mostly synthetic, with reference to their pressor action, toxicity, effect on smooth muscle organs, and other structures The present investigation deals with the influence of forty such amines upon the blood sugar Particular attention is drawn to any possible correlation between the pressor and hyperglycemic actions as the chemical structure varies

The entire list of forty compounds is found in Table I The majority of the substances are derivatives of the following three formulas

1 C_6H_5 CH NHR [I]

2 C_6H_5 CHH^1 CHR NR^1R^2 [II]

3  [III]

wherein R, R^1 and R^2 = H or alkyl group, H^2 = H, OH, alkyl or alkyloxy, and H^1 and H^3 = H or OH Four additional compounds are derivatives of indolethylamine, three, of phenyl-piperidyl-carbinols, and one, of phenyl-pyrazolone In all, twelve primary, twenty-five secondary, two tertiary amines and one quaternary ammonium iodide are included

Rabbits weighing approximately 2 Kg were used for study Aqueous solutions of the hydrochlorides of the salts were injected in the marginal vein of one ear and samples of blood were taken from that of the other Equimolecular doses, that is, 1 cc of a $M/10$ solution, were given, except a few, the toxicity of which was too great In such instances, the amount was reduced Three animals were used to study each compound Blood samples, besides the controls, were taken 2, 5, 10, 20, 30, 40, 50 and 60 minutes after injection, and every half hour thereafter until the sugar concentration approximately returned to normal The blood sugar was determined by the method of Hagedorn and Jensen (11) Six compounds were also studied following subcutaneous injection The results for each were averaged and summarized in Table I

* Scientific Section A PH A Madison meeting 1933

1 COMPOUNDS OF FORMULA [I]

Only two compounds, Nos 1 and 2, belonging to the general formula, C_6H_5-CH_2NHR, were studied No 1, $C_6H_5CH_2NH_2HCl$, produced on the average a rise of 25 mg of sugar per 100 cc of blood, reaching its peak in 30 minutes after injection, while No 2, $C_6H_5CH_2NHCH_3HCl$, produced a rise of 18 mg, the maximum occurring in 10 minutes In this case the primary amine seems to have a greater and more prolonged hyperglycemic action

2 COMPOUNDS OF FORMULA [II]

Twenty-two compounds of the type, $C_6H_5CHH^1CHRNR^1R^2$, were investigated This includes the six optical isomers of ephedrine No 3, β-phenyl-ethylamine HCl, produced a rise of 27 mg, while No 4, with the OH group on the β-C atom, produced a rise of only 14 mg No 3 reached its peak at 40 minutes after injection, while No 4 attained its greatest effect at the end of an hour It is interesting to note that No 4 was the only compound which consistently produced

TABLE I —COMPOUNDS EXAMINED FOR HYPERGLYCEMIC ACTION

Compound No	Hydrochlorides of	Results: Maximal Rise of Blood Sugar mg per 100 cc Blood	Results: Time to Reach Peak after Injection (Minutes)
1	$C_6H_5CH_2NH_2$	25	30
2	$C_6H_5CH_2NHCH_3$	18	10
3	$C_6H_5CH_2CH_2NH_2$	27	40
4	$C_6H_5CHOHCH_2NH$	14	60
5	$C_6H_5CHOHCH_2NHC_4H_9$	39	30
6	$C_6H_5CHOHCHCH_3NH_2$	12	30
7	$C_6H_5CHOHCHCH_3NH_2$ *nor d* Pseudoephedrine	17	30
8	$C_6H_5CHOHCHCH_3NHCH_3$ *dl* Ephedrine	20	40
9	$C_6H_5CHOHCHCH_3NHCH_3$ *l* Ephedrine	13	10
10	$C_6H_5CHOHCHCH_3NHCH_3$ *d* Ephedrine	25	40
11	$C_6H_5CHOHCHCH_3NHCH_3$ *dl* Pseudoephedrine	14	30
12	$C_6H_5CHOHCHCH_3NHCH_3$ *d* Pseudoephedrine	20	30
13	$C_6H_5CHOHCHCH_3NHCH_3$ *l* Pseudoephedrine	30	40
14	$C_6H_5CHOHCHCH_3N(CH_3)$ *l* Methyl ephedrine	11	20
15	$C_6H_5CHOHCHCH_4NHC_2H_5$	17	50
16	$C_6H_5CHOHCHCH_3NH(CH_2CHOH)$	22	50
17	$C_6H_5CHOHCHCH_3NHC_3H$	21	50
18	$C_6H_5CHOHCHCH_3NHCH(CH_3)_2$	18	30
19	$C_6H_5CHOHCHCH_3NHC_4H_9$	54	30
20	$C_6H_5CHOHCHCH_3NHC_5H_{11}$	40	10
21	$C_6H_5CHOHCHCH_3NH(CH_2C_6H_5)$	71	90
22	$C_6H_5CHOHCHCH_3NH(CH_2CH_2C_6H_5)$	45	60
23	$C_6H_5CHOHCHC_2H_5NHCH_3$	22	20
24	$C_6H_5CHOHCHC_3H_7NHCH_3$	22	20
25	*p* HO C_6H_4 CH CH NH_2 Tyramine	17	30
26	*p* HO C_6H_4 CHOH CH $NHCH_3$ Sympatol	35	20
27	*p* HO $C_6H_4CHOHCHCH_2NH$	28	20
28	*p* $CH_3C_6H_4CHOHCHCH_3NH_2$	27	20
29	*p* $CH_3OC_6H_4CHOHCHCH_3NH_2$	18	30
30	*3 4* $(HO)_2C_6H_3CHOHCH$ $NHCH_3$ *l* Epinephrine	55	60
31	*3 4* $(HO)_2C_6H_3CHOHCHCH_3NH_2$ *3 4* Dihydroxy *nor* ephedrine	45	30
32	*3 4*-$(HO)_2C_6H_3CHOHCHCH_3$ $NHCH_3$ *3 4* Dihydroxy ephedrine	3	50
33	$C_8H_6CH_2CH_2NH_2$ Tryptamine	24	40
34	$C_8H_6CH_2CH_2NHCH_3$ Methyl tryptamine	29	60
35	$C_8H_6CH_2CH_2N(CH_3)_2$ Dimethyl tryptamine	35	30
36	$C_8H_6CH_2CH_2N(CH_3)_3I$ Trimethyl tryptamine quaternary ammonium iodide	50	20
37	$C_6H_5CHOHCH{-}CH_2{-}CH$ / $NH{-}CH_2{-}CH_2$ Phenyl *2* piperidyl carbinol	3	10
38	$C_6H_5CHOHCH{-}CH{-}CH_2$ / $CH_2{-}NH{-}CH_2$ Phenyl *3* piperidyl carbinol	10	20
39	$C_6H_5CHOHCH{-}CH{-}CH_2$ / $CH_2{-}CH{-}NH$ Phenyl *4* piperidyl carbinol	10	10
40	NH—CO / C_6H_4N C $CH_2CH_2NH_2$ / C CH_2 *2* Phenyl *3* methyl *5* pyrazolone *4* ethylamine	18	30

Average of three experiments

first a fall and then a rise of blood sugar Five minutes after injection, a fall of 9 mg occurred At the end of 30 minutes the blood sugar returned to its initial level, following which a rise occurred for the next 30 minutes No 5, a secondary amine, related to No 4 with a butyl group replacing one H on the N atom, gave a rise of 39 mg This agrees with the observations on other compounds of similar structure, that is, increase in the number of C atoms attached to the N atom appears to increase the hyperglycemic action No 6, the *dl*-product synthesized by Hartung, and No 7, the *d*-form isolated from Ma Huang by Smith (12), differ from No 4 in that a CH_3 group is attached to the α-C atom The natural product produced slightly greater rise, 17 mg as against No 6 which caused a rise of 12 mg Methylation on the α-C atom apparently has little influence on the hyperglycemic action since Nos 4, 6 and 7 are nearly the same

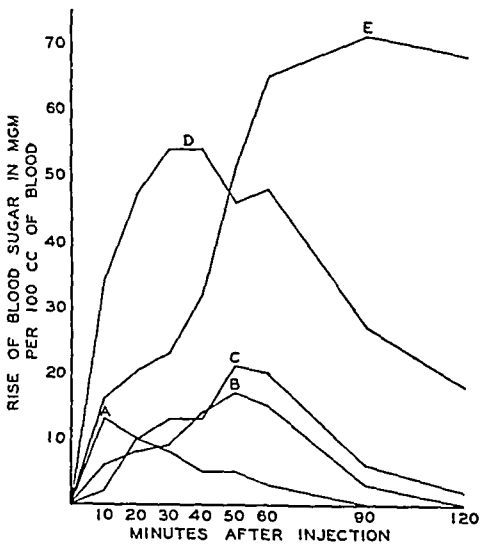


Fig 1 —Comparison of Hyperglycemic Action of 5 Homologs

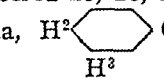
A C_6H_5 CHOH $CHCH_3$ $NHCH_3$ 1 cc $M/10$ Solution B C_6H_5 CHOH $CHCH_3$ NHC_2H_5, 1 cc $M/10$ Solution C C_6H_5 CHOH $CHCH_3$ NHC_3H_7, 1 cc $M/10$ Solution D C_6H_5-CHOH $CHCH_3$ NHC_4H_9 1 cc $M/10$ Solution E C_6H_5 CHOH $CHCH_3$ NH CH_2 C_6H_5, 1 cc $M/10$ Solution

Compounds numbered 8 to 13, inclusive, are the six optical isomers of ephedrine Their order of activity on blood sugar is as follows No 9 < No 11 < No 12 < No 8 < No 10 < No 13, the last producing a rise three times that of the first *l*-Ephedrine, No 9, has the least hyperglycemic action Chen, Wu and Henriksen (8) showed that the relation in pressor action was No 13 < No 11 < No 12 < No 10 < No 8 < No 9, No 9 being 35 times as strong as No 13 Obviously, there is no correlation between the pressor and hyperglycemic actions in the optical isomers of ephedrine No 14, the *l*-methyl ephedrine isolated from Ma Huang by Smith (13), was found to be practically the same as *l*-ephedrine and *dl*-pseudoephedrine

Compounds numbered 15, 17, 18, 19, 20, 21 and 22 differ from each other in the number of C atoms attached to the N atom (Table I) No 15, the ethyl derivative, is slightly stronger than the methyl derivative (No 9, ephedrine) The *n*-propyl derivative, No 17, is stronger than the iso-propyl derivative, No 18, and both in turn are stronger than the ethyl compound, No 15 The butyl derivative, No 19, produced a rise of 54 mg and the amyl derivative, No 20, showed a 40-mg rise However, only half the usual dose for No 20 was given due to its high toxicity With the addition of a benzene ring on the N atom, a further rise was observed No 21 caused a rise of 71 mg , and No 22 a rise of 45 mg Half the dosage was also used for No 22 It appears that the hyperglycemic action increases as the number of C atoms attached to the N atom increases, as well illustrated in Fig 1 This is contrary to

the pressor action, for Chen, Wu and Henriksen (8) showed that the pressor action decreases as the side chain on the N atom lengthens However, when the number of C atoms linked with the α-C atom is increased, no augmentation of the hyperglycemic action occurs since Nos 23 and 24 produced the same effect

3 COMPOUNDS OF FORMULA [III]

Compounds numbered 25, 26, 27, 28, 29, 30, 31 and 32 are all derivatives of the general formula,  The first five possess

an OH, CH_3 or CH_3O group in the para position, while the remaining three have OH groups in both the para and meta positions It is difficult to say what influence a single phenolic OH exerts in a compound, for No 25 is weaker than No 3, but in contrast to this, No 27 is stronger than No 6 (Table I) The introduction of a methyl radicle to the para position seems to increase the hyperglycemic activity while a methoxy group seems to decrease it However, only one example of each was investigated

Owing to the fact that epinephrine is a potent substance, its dose was reduced to 0 1 cc of a 1 1000 solution which represents approximately $^1/_{200}$ of the average amount of the preceding compounds administered Epinephrine injected intravenously produced a rise of 55 mg per 100 cc Compounds numbered 31 and 32 resemble epinephrine in that they both have two OH groups in the para and meta positions Like epinephrine, they have a high pressor action (10) With No 31, a maximal rise of 45 mg of blood sugar was observed following the intravenous injection of 1 cc of 1 1000 solution No 32 in the dosage of 1 cc of a 1 500 solution caused a rise of 37 mg , reaching its peak in 50 minutes It is here that the rise of blood sugar qualitatively follows the pressor action

TABLE II —COMPOUNDS STUDIED BY SUBCUTANEOUS INJECTION

Compound	Approximate Dose Mg per Kg	Rise in Blood Sugar Intravenous	Subcutaneous
l Ephedrine	20	13	0
Sympatol	20	35	0
Trimethyl tryptamine quaternary ammonium iodide	33	50	0
l Epinephrine	0 1	55	55
3 4 Dihydroxy-*nor* ephedrine	1 0	45	32
3,4 Dihydroxy-ephedrine	2 0	37	90

4 ADDITIONAL COMPOUNDS STUDIED

Of the simpler indole derivatives, the order of activity on blood sugar is dimethyl-tryptamine > methyl-tryptamine > tryptamine In pressor action, the reverse is true (10) Trimethyl-tryptamine quaternary ammonium iodide, No 36, was given in doses of 1 cc of $M/40$ solution An average rise of 50 mg was noted The pressor action in this case is also greater than other tryptamines (10) The

first a fall and then a rise of blood sugar Five minutes after injection, a fall of 9 mg occurred At the end of 30 minutes the blood sugar returned to its initial level, following which a rise occurred for the next 30 minutes No 5, a secondary amine, related to No 4 with a butyl group replacing one H on the N atom, gave a rise of 39 mg This agrees with the observations on other compounds of similar structure, that is, increase in the number of C atoms attached to the N atom appears to increase the hyperglycemic action No 6, the *dl*-product synthesized by Hartung, and No 7, the *d*-form isolated from Ma Huang by Smith (12), differ from No 4 in that a CH_3 group is attached to the α-C atom The natural product produced slightly greater rise, 17 mg as against No 6 which caused a rise of 12 mg Methylation on the α-C atom apparently has little influence on the hyperglycemic action since Nos 4, 6 and 7 are nearly the same

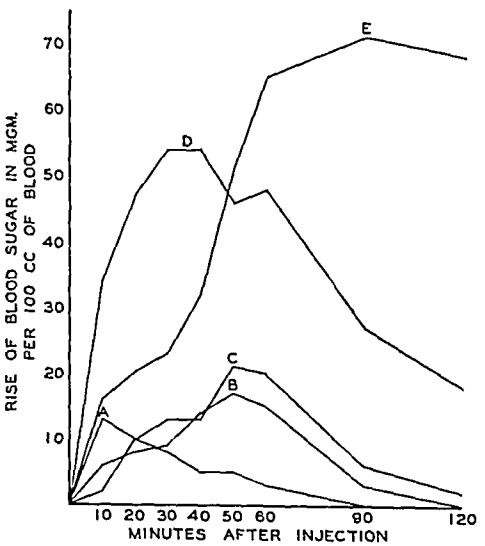


Fig 1 —Comparison of Hyperglycemic Action of 5 Homologs

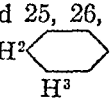
A C_6H_5 CHOH $CHCH_3$ $NHCH_3$, 1 cc $M/10$ Solution B C_6H_5 CHOH $CHCH_3$ NHC_2H_5, 1 cc $M/10$ Solution C C_6H_5 CHOH $CHCH_3$ NHC_3H_7, 1 cc $M/10$ Solution D C_6H_5-CHOH $CHCH_3$ NHC_4H_9 1 cc $M/10$ Solution E C_6H_5 CHOH $CHCH_3$ NH CH_2 C_6H_5, 1 cc $M/10$ Solution

Compounds numbered 8 to 13, inclusive, are the six optical isomers of ephedrine Their order of activity on blood sugar is as follows No 9 < No 11 < No 12 < No 8 < No 10 < No 13, the last producing a rise three times that of the first *l*-Ephedrine, No 9, has the least hyperglycemic action Chen, Wu and Henriksen (8) showed that the relation in pressor action was No 13 < No 11 < No 12 < No 10 < No 8 < No 9, No 9 being 35 times as strong as No 13 Obviously, there is no correlation between the pressor and hyperglycemic actions in the optical isomers of ephedrine No 14, the *l*-methyl ephedrine isolated from Ma Huang by Smith (13), was found to be practically the same as *l*-ephedrine and *dl*-pseudoephedrine

Compounds numbered 15, 17, 18, 19, 20, 21 and 22 differ from each other in the number of C atoms attached to the N atom (Table I) No 15, the ethyl derivative, is slightly stronger than the methyl derivative (No 9, ephedrine) The *n*-propyl derivative, No 17, is stronger than the iso-propyl derivative, No 18, and both in turn are stronger than the ethyl compound, No 15 The butyl derivative, No 19, produced a rise of 54 mg and the amyl derivative, No 20, showed a 40-mg rise However, only half the usual dose for No 20 was given due to its high toxicity With the addition of a benzene ring on the N atom, a further rise was observed No 21 caused a rise of 71 mg , and No 22 a rise of 45 mg Half the dosage was also used for No 22 It appears that the hyperglycemic action increases as the number of C atoms attached to the N atom increases, as well illustrated in Fig 1 This is contrary to

the pressor action, for Chen, Wu and Henriksen (8) showed that the pressor action decreases as the side chain on the N atom lengthens However, when the number of C atoms linked with the α-C atom is increased, no augmentation of the hyperglycemic action occurs since Nos 23 and 24 produced the same effect

3 COMPOUNDS OF FORMULA [III]

Compounds numbered 25, 26, 27, 28, 29, 30, 31 and 32 are all derivatives of the general formula,  The first five possess

an OH, CH_3 or CH_3O group in the para position, while the remaining three have OH groups in both the para and meta positions It is difficult to say what influence a single phenolic OH exerts in a compound, for No 25 is weaker than No 3, but in contrast to this, No 27 is stronger than No 6 (Table I) The introduction of a methyl radicle to the para position seems to increase the hyperglycemic activity while a methoxy group seems to decrease it However, only one example of each was investigated

Owing to the fact that epinephrine is a potent substance, its dose was reduced to 0 1 cc of a 1 1000 solution which represents approximately $^1/_{200}$ of the average amount of the preceding compounds administered Epinephrine injected intravenously produced a rise of 55 mg per 100 cc Compounds numbered 31 and 32 resemble epinephrine in that they both have two OH groups in the para and meta positions Like epinephrine, they have a high pressor action (10) With No 31, a maximal rise of 45 mg of blood sugar was observed following the intravenous injection of 1 cc of 1 1000 solution No 32 in the dosage of 1 cc of a 1 500 solution caused a rise of 37 mg , reaching its peak in 50 minutes It is here that the rise of blood sugar qualitatively follows the pressor action

TABLE II —COMPOUNDS STUDIED BY SUBCUTANEOUS INJECTION

Compound	Approximate Dose Mg per Kg	Rise in Blood Sugar Intravenous	Subcutaneous
l Ephedrine	20	13	0
Sympatol	20	35	0
Trimethyl tryptamine quaternary ammonium iodide	33	50	0
l-Epinephrine	0 1	55	55
3,4-Dihydroxy-*nor* ephedrine	1 0	45	32
3,4 Dihydroxy ephedrine	2 0	37	90

4 ADDITIONAL COMPOUNDS STUDIED

Of the simpler indole derivatives, the order of activity on blood sugar is dimethyl-tryptamine > methyl-tryptamine > tryptamine In pressor action, the reverse is true (10) Trimethyl-tryptamine quaternary ammonium iodide, No 36, was given in doses of 1 cc of $M/40$ solution An average rise of 50 mg was noted The pressor action in this case is also greater than other tryptamines (10) The

three phenyl-piperidyl carbinols and the pyrazolone, No 40, all caused a slight elevation of blood sugar

5 SIX COMPOUNDS STUDIED SUBCUTANEOUSLY

Compounds numbered 9, 26, 30, 31, 32 and 36 were also studied following the subcutaneous injection The dosage employed was the same as that used for intravenous administration As shown in Table II, ephedrine, sympatol and trimethyl-tryptamine quaternary ammonium iodide failed to show any hyperglycemic action upon the subcutaneous injection With epinephrine and its two homologs (Nos 31 and 32), however, a distinct rise of blood sugar was observed There was practically no difference between the intravenous and subcutaneous injections of epinephrine *3,4*-Dihydroxy-*nor*-ephedrine is less effective by subcutaneous injection, but *3,4*-dihydroxy-ephedrine, on the other hand, is more than twice as active as by intravenous administration

DISCUSSION

There are few generalizations that can be made concerning the relationship between the hyperglycemic action and chemical structure Two primary amines are stronger than two corresponding secondary amines, and two vice versa Methylation of a compound may therefore increase or decrease the power to raise blood sugar The lengthening of the side chain attached to the N atom is accompanied by an increase of the hyperglycemic action The introduction of an OH group at the para position may result in an augmentation or reduction of the sugar raising property When a compound has a structure closely similar to that of epinephrine, such as *3,4*-dihydroxy-ephedrine and *-nor*-ephedrines, the activity is at once increased Furthermore, they become effective in influencing the blood sugar by either intravenous or subcutaneous injections

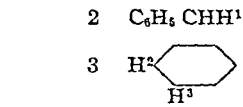
It is evident that there is little correlation between the hyperglycemic and pressor actions, in fact, they are often diametrically opposite For example, the pressor action diminishes and finally disappears as the length of the side chain of the N atom increases, while the reverse is true regarding the hyperglycemic effect The order of the pressor activity of the six optical isomers of ephedrine has been found to be *l-* > *dl-* > *d-* > *d-ψ* > *dl-ψ* > *l-ψ* On the other hand, their action on the blood sugar is almost in reverse ratio *l-ψ* > *d-* > *d-ψ* or *dl-* > *dl-ψ* > *l-* The rise of blood sugar becomes highest when the structure of the compound approaches that of epinephrine Even in this case the resemblance is merely qualitative It may be interesting to point out here that only epinephrine and its close homologs raise blood sugar by subcutaneous injection

SUMMARY

A series of forty compounds has been studied for their hyperglycemic action Most of them are derivatives of one of three formulas

1 $C_6H_5\,CH_2\,NHR$

2 $C_6H_5\,CHH^1\,CHR\,NR^1R'$

3  $CHH^1\,CHR^1\,NHR$

wherein R, R^1 and R^2 = H or alkyl group, H^2 = H, OH, alkyl or alkyloxy, and H^1 and H^3 = H or OH Four derivatives of indolethylamine, three those of phenyl-piperidyl-carbinols, and one that of phenyl-pyrazolone complete the list of substances investigated

With an increase in the number of C atoms in R, R^1 and R^2, the hyperglycemic action increases

There is little correlation between the pressor action and hyperglycemic action as the chemical structure varies They are often diametrically opposite

When the structure of a compound approaches that of epinephrine, a small amount will be necessary to cause a distinct response of hyperglycemia The epinephrine homologs also raise blood sugar by subcutaneous injection

REFERENCES

(1) Blum, *Arch ges Physiol* 90 (1901) 617
(2) Herter and Wakeman *Arch path Anat* 169 (1902) 479
(3) Paton *J Physiol* 29 (1903) 286
(4) Morita *Arch exptl Path Pharmakol* 78 (1915), 245
(5) Kageyama *Acta Schol Med* 1 (1916), 215 and 229
(6) Nagel *Arch exptl Path Pharmakol* 110 (1925) 129
(7) Wilson *J Pharmacol*, 30 (1927) 209
(8) Chen Wu and Henriksen *Ibid* 36 (1929), 363
(9) Swanson JOUR A PH A 21 (1932) 1125 (No 11)
(10) Chen and Chen *Ibid* 22 (1933) 813
(11) Hagedorn and Jensen *Biochem Z*, 46 (1923) 135
(12) Smith *J Chem Soc* 131 (1928) 51
(13) Smith, *Ibid* 130 (1927), 2056

LILLY RESEARCH LABORATORIES INDIANAPOLIS

PANCREATIN AND ITS ASSAY *

BY F E WILLSON

The U S P X has definite standards for the trypsin and amylase content of pancreatin The B P 1932, also, has definite standards for these two enzymes in pancreatin and in addition has a standard for lipase content The methods of determining tryptic and amylase content differ materially in the two pharmacopœias and also the standards set do not compare very closely For this reason it is interesting to compare the different methods and observe some of the difficulties met with

The U S P Trypsin Method—According to the U S P X trypsin test, pancreatin should convert not less than twenty-five times its weight of casein into soluble proteoses Therefore in this particular assay casein is used as the substrate The actual method employed is essentially that known as the Fuld-Gross (1), (2) A 0 2% solution of casein is prepared by the use of sodium hydroxide A definite quantity of a solution of the pancreatin to be tested is added to a definite quantity of the casein solution Digestion is allowed to proceed for one hour's time, after

* Scientific Section A PH A Madison meeting 1933

which the degree of digestion of the casein is determined by the addition of an alcohol-acetic acid mixture (U S P X, page 275)

This particular method has been the cause of considerable criticism and controversy among those concerned with the evaluation of pancreatin The cause of variations in results obtained in carrying out this test is chiefly accounted for by the indefiniteness of the end point This particular difficulty was pointed out in an earlier paper (3)

Another source of variance in results may be found in the sample of powdered casein used for the substrate There is a considerable difference in the various caseins on the market A number of samples we have tested failed to give a clear solution in an alkaline solution They are therefore unsuitable for use Also several samples of casein examined have had a decided alkalinity which also would make them unsuitable for the U S P test, since a more definite hydrogen-ion concentration is necessary Furthermore with the casein supply there is a possibility of variance in moisture content of the different lots of casein

Still another point that should be observed in carrying out trypsin assays is that the pancreatin to be tested should be left in contact with water for at least one hour before test if the full tryptic activity is to be obtained

From these difficulties pointed out it will be observed that the present U S P method is not an entirely satisfactory method

The B P Trypsin Method—The B P 1932 employs a modification of the Smith-Sorenson method (4) for determining the tryptic activity Fresh milk from which the cream has been removed is used as the substrate In other words, fresh milk furnishes the casein supply To ensure a constant amount of casein being present, directions are given for adjustment The milk solution is also adjusted to a definite p_H after which the pancreatin solution is added and the digestion allowed to proceed for one and a half hours at 38° to 40° C At the end of this time the digestion mixture is rapidly cooled to 20° C and a formol titration carried out by which the amino acids formed during the digestion are titrated A blank is run on the milk and a boiled sample of pancreatin for correction purposes Definite limits have been adopted in terms of $N/20$ sodium hydroxide solution for pancreatin to meet this tryptic standard

The method, in general, seems quite satisfactory for use Many factors which enter into the U S P method are eliminated in this method Furthermore, a definite end-point is obtained which cannot be interpreted differently by various operators

There are several points in the B P method which may give a considerable variance in results The first and most serious objection to the test is the use of fresh milk as the substrate The opinion is expressed that milk does not furnish a substrate that is constant enough in composition to give perfectly satisfactory results This is true even though the adjustments directed by the B P are carried out The difference in the milk supply in different parts of the country was demonstrated during certain cooperative work carried out on rennin Quite different results were obtained depending upon the section of the country the tests were carried out in and also in the source and processing the milk had gone through This apparently was due to differences in the composition of the milk The same conditions, it would seem, will apply to the B P test Carrying out the test in

different parts of the country or even different seasons of the year are liable to give quite different results This could be avoided by the use of powdered casein of specified purity which would have supplied a substrate of constant composition and would not have required the adjustment that the milk does before use

The Modified Smith-Sorensen Test—It has been pointed out that the present U S P method of determining trypsin is far from satisfactory The question then arises, how can the present method be improved or what methods are available for substitution? In our opinion the present method should be discarded and a new one substituted In a previous paper (5) a modification of the Smith-Sorensen test was suggested Since that time considerable work has been done on it in this laboratory as well as other laboratories The results so far obtained indicate the method is satisfactory and at the same time not liable to the various sources of error that the present U S P method contains The method previously suggested has not been changed with the exception of a few minor points

The adjustment of the p_H of the casein solution has been a troublesome problem in working out this method At first a combination of phenolphthalein and brom-thymol blue was used This was not entirely satisfactory so after considerable experimentation an aqueous solution of cresol red seemed most suitable To give some idea of the different results obtained with different indicators two solutions of casein were prepared One was prepared to have a p_H of not more than 8 0 while the other was prepared to have a p_H greater than 8 0 The following table gives the results obtained with various indicators

Indicator	Solution I	Solution II
Cresol Red (aqueous)	7 6	8 8
Brom Thymol Blue (alcoholic)	6 9	7 7
Phenol Red (alcoholic)	No comparison possible	
Phenol Red B P (alcoholic)		
Phenol Red (aqueous)	8 0+	8 4+
Thymol Blue		8 40
By potentiometer (quinhydrone electrode)	7 54	8 65

In determining the p_H with the various indicators the Hellige Hydrogen-Ion Comparator with the standard discs supplied for each indicator was used

From the above table it will be observed that with both solutions the p_H obtained using an aqueous solution of cresol red approximated very closely the p_H obtained by potentiometric means

Phenol red proved to be entirely unsatisfactory The difficulty seemed to lie in the fact that the casein solution apparently absorbs some of the color of the indicator which gives a resulting color that does not compare with the comparison standard This color change seems to be more pronounced with alcoholic solutions of phenol red than aqueous solutions of the indicator

A change is suggested in the strength of the alkali to be used for titration in the Modified Smith-Sorensen method A $N/10$ sodium hydroxide was previously suggested Since then a $N/20$ sodium hydroxide solution has been used during certain cooperative work carried on Lately, we have used $N/50$ sodium hydroxide which has the advantage of giving a greater volume required for neutralization and in this way reducing the experimental error Another advantage of including $N/50$ alkali would be that the method would be more available for U S P inclusion

if it were looked upon favorably A $N/50$ sodium hydroxide is official while a $N/20$ sodium hydroxide is not

Another point in which the proposed method could be improved upon for inclusion in the U S P would be in regard to the temperature of digestion The present method suggests a temperature of 55° C This is the temperature used in the original Smith Sorensen method A temperature of 52° C would be more suitable if the method were to be included in the next U S P The reason for this is that most laboratories carrying out enzyme assays according to the present U S P directions have a water bath regulated at 52° C for pepsin assays Therefore if the temperature of digestion for this tryptic activity method were changed to 52° C the same bath would be available for carrying out the digestion This, however, would be a matter for further investigation

The standard given for computing the tryptic activity of pancreatin samples using this method is a more or less arbitrary one based to some extent on the present U S P standard A sample that digests 25 times its own weight of casein into soluble proteoses should require on the Modified Smith-Sorensen method approximately 5 0 cc of $N/50$ sodium hydroxide

The feeling is expressed that using the proposed method for assay of tryptic activity a more satisfactory method of determination would be available with less divergent results being obtained by different workers

COMPARISON OF RESULTS BY THE U S P, B P AND MODIFIED SMITH-SORENSEN METHODS

Having considered these three methods it is of interest to see how they compare as far as actual results are concerned Five samples of pancreatin labeled U S P were procured on the market at the same time They were all carefully assayed according to each method and the results expressed in terms of percentage of the standard adopted for each test The results are as follows

T	U S P Method	B P Method	Smith-Sorensen Method
Sample A	150%	256%	160%
Sample B	220%	296%	226%
Sample C	210%	231%	234%
Sample D	105%	244%	122%
Sample E	220%	343%	234%

From these results it will be observed that with the exception of two samples the others are at least twice as strong as the U S P requirements This is not entirely surprising since the method of manufacture and the resulting activity will be controlling factors Since there are two standards to be met by the U S P, the samples of pancreatin must be put on the market according to the lowest of the two activities shown to meet the U S P standard This is to say, it would be almost impossible to market a sample of pancreatin assaying exactly the U S P requirements by both the tryptic standard and the amylase standard

The B P standard seems a little lower than the present U S P standard From the results on the above samples no satisfactory conclusions can be obtained as to the ratio In some cases the ratio is relatively large, whereas with Sample C the ratio is very small The one conclusion that can be drawn, however, is that

pancreatin samples meeting the U S P standard for trypsin will also meet the B P standard for this same activity

The U S P Amylase Assay—The U S P X states that pancreatin should convert not less than twenty-five times it weight of starch into soluble carbohydrates In carrying out this particular assay a 3 75% starch paste is used and digestion is allowed to proceed 5 minutes with the pancreatin solution The completeness of digestion is determined by adding a definite amount of the digestion mixture to a dilute iodine solution If no color is produced the pancreatin meets the U S P specification for amylase

This U S P method is for the most part satisfactory but there are a few points in it that may cause differences in results One of the most important of these points concerns the preparation of the starch to be used for test Detailed instructions are given by the U S P for the starch to be used It amounts to this, that ordinary potato starch is thoroughly washed with distilled water and dried The moisture content is then determined and the starch used on the dry basis for the preparation of the 3 75% paste If the U S P method of washing is carried out and the washed starch dried slowly by a gradual raising of temperature of 50° C, there seems to be less difference in results than if ordinary purified potato starch is used However, if the washed starch is immediately subjected to a temperature of 50° C and maintained at this temperature until the greater part of the moisture is driven off, there seems to be a hardening action of some sort on the starch granules Using starch dried in this manner invariably gives lower results of amylolytic power than when starch dried gradually or not subjected at all to washing and drying is used There seems very little necessity of going through this washing with subsequent drying if the starch to be used has a neutral reaction Most of the potato starch of commerce, to-day, is a highly purified product

Another point in regard to the starch is the method of determining the moisture content The moisture content is directed to be carried out by heating four hours at a temperature of 120° C In determining the moisture content in this manner, with many samples of starch it has been a subject of some doubt as to whether the actual moisture content was being determined With a number of samples, some caramelization has taken place when subjected to this temperature It would appear that a more satisfactory method would be to dry at 100° C possibly for a considerably greater length of time Investigation has shown that caramelization does not take place at this temperature

The U S P directs that the equivalent amount of starch to make a 3 75% paste is mixed with boiling water and boiled for approximately 5 minutes In preparing a starch paste in this manner, many times a satisfactory paste is not obtained The paste produced is invariably quite thick in consistency and often very "lumpy" This increases the chance of using a paste that is not exactly 3 75% starch This can be overcome and avoided by heating water to between 50° and 60° C and then adding a water suspension of the starch with constant stirring The starch mixture is then brought to boiling and boiled for 5 minutes and finally adjusted to weight In this way a perfectly homogeneous starch paste can be prepared which is much thinner in consistency than one prepared according to U S P directions This difference in consistency makes it much easier to handle and weigh out for test

The end-point obtained also is often a matter of doubt This phase of the amylase test was, however, quite fully dealt with in an earlier paper (3)

The B P Amylase Assay—The B P amylase test differs somewhat from the U S P test Instead of using ordinary potato starch, soluble starch is employed A 1% solution of this soluble starch with 5% of sodium chloride is used in place of 3 75% starch paste The test is carried out on a small quantity of this starch solution as compared to the U S P method of using 200 Gm of the paste The digestion is carried out for one hour at 40° C instead of the U S P time of five minutes at 40° C At the end of the digestion period the tubes are rapidly cooled to 20° C and *N*/50 iodine solution added directly to the digestion tubes instead of withdrawing a definite amount and adding it to iodine solution as is the case with the U S P method

There is one serious objection to this B P method The quantities of pancreatin used for tests are too small For instance, a series ranging from 0 35 cc to 0 65 cc using 0 05-cc intervals are directed to be used for tests These quantities are much too small to warrant accurate results, especially when dealing with enzymes

The use of soluble starch as the substrate appears to be a good one The chance that a homogeneous mixture will not be obtained is very remote However, no mention of moisture content of the soluble starch is made which may cause some variance in results

The use of sodium chloride in making the starch solution is probably an unwise choice in one respect It has been proven that sodium chloride is an activator for pancreatic amylase Therefore the results obtained may be higher than the absolute activity of the enzyme

Another interesting point in the B P directions is that on the addition of the iodine solution to the digested mixtures, the end-point in the series is that tube showing no blue color In other words, they take as their end-point simply the complete conversion of the starch present In the U S P method the starch must be converted down through the various dextrins to the sugars It is the dextrins that give the red and purple colors with iodine solution that the U S P directs must not be present

COMPARISON OF U S P AND B P AMYLASE ASSAYS

Some idea of how the U S P and B P assay results compare can be gained from results obtained on the five samples of U S P samples which were mentioned in dealing with trypsin activity The results are as follows

	U S P Assay	B P Assay
Sample A	100%	900%
Sample B	45%	500%
Sample C	8%	110%
Sample D	80%	800%
Sample E	75%	720%

In expressing the above results a pancreatin converting 25 times its weight of starch into soluble carbohydrates was expressed as being 100%

A similar method was used for expressing the B P results Therefore in stating a sample is 900% by the B P what is meant is that the sample is 9 times the strength allowed by the B P

In looking over the above results it is interesting to note that though all five samples were labeled U S P there is only one sample that actually meets the U S P specifications This does not, however, mean that the above samples were put on the market below the U S P specifications It is simply a case of dealing with an enzyme of unstable activity The instability of pancreatic amylase is a point to which very little attention has been paid up to the present time Whether this particular instability applies to the liquefying power as well as the starch conversion power of pancreatic amylase is an open question, it seems, at the present time From observations made, the liquefying power does not necessarily parallel the starch conversion power This particular point is being investigated, further, with pancreatic amylase and amylases from other sources at the present time

From the table of results given it will also be observed that the U S P standard is about 10 times that of the B P standard This is not surprising since it has already been pointed out that the B P specifications do not require the digestion to proceed down through the dextrin stage Therefore much higher results could be expected in relation to the U S P method

The difficulties experienced with the amylase test of the present U S P is a problem to which very little attention has been paid up to the present time How to improve upon or change the method is a matter of opinion In the first place we feel that very few pancreatin samples on the market for any length of time will meet the U S P specifications As already pointed out this is a matter of loss of activity

In regard to the end-point used in the present U S P method it is quite liable to variance Possibly a modification of the Fehling's solution method would prove more satisfactory as an end-point and at the same time be more accurate for the specification desired by the U S P, *i e*, conversion into "soluble carbohydrates"

The B P Lipase Assay—The B P, as already stated, has a definite standard for lipase content The U S P has up to the present time made no attempt to standardize pancreatin on this basis The B P method for determination of lipase, utilizing the cream from fresh milk, is a very ingenious one and from the brief experience with it seems quite satisfactory It is much simpler than any of the other lipase methods available and at the same time gives a very definite end-point The results obtained on the five samples of U S P Pancreatin used throughout the comparison of these different methods give the following results by the B P method

	B P Lipase.
Sample A	129%
Sample B	107%
Sample C	63%
Sample D	100%
Sample E	83%

From these above results it will be observed that three meet the B P specifications while two are below the specifications

SUMMARY

1 The U S P, B P and Modified Smith-Sorensen assay methods for trypsin are discussed and the results by each method compared

2 Certain changes are suggested for improving the Modified Smith-Sorensen method

3 The U S P and B P Amylase assay methods are discussed and compared

4 Results of lipase content by the B P method are given for five samples of Pancreatin U S P X examined

LITERATURE CITED

(1) E Fuld and L A Levison *Biochem Z*, 6 (1907), 473
(2) O Gross *Arch exptl Path Pharmakol* 58 (1906), 157, 166
(3) I E Willson Jour A Ph A, 19 (1930) 128–129
(4) A R Smith *Pharm J* 35 (1912) 137
(5) F E Willson, Jour A Ph A, 19 (1930), 129–132

Analytical Dept
Parke Davis & Co
Detroit Mich

THE DETERMINATION OF STRYCHNINE AND BRUCINE AS HYDRO FERROCYANIDES AND THEIR SEPARATION BY MEANS OF FERROCYANIDE *

BY I M KOLTHOFF AND J J LINGANE

The usual procedure for the separation of strychnine from brucine is based on the fact that brucine is fairly easily destroyed by treatment with nitric acid In the present work it was found that this method yields approximate results only, either the brucine is not completely destroyed or on more drastic treatment part of the strychnine is decomposed also Therefore a more exact method would be of value It is known that ferrocyanide in acid medium gives slightly soluble crystalline hydroferrocyanides with strychnine and brucine, the former crystallizes much faster and is less soluble than the latter Beckurts and Holtz[1] made use of this difference in behavior and titrated a strongly acid solution of the mixed alkaloids with standard potassium ferrocyanide, using ferric chloride test paper as an outside indicator The success of the method depends on the slowness with which brucine is precipitated by the slight excess of ferrocyanide after the precipitation of strychnine is complete The detection of the end-point, however, is not very sharp, after much practice an accuracy of about 5% could be obtained

Gadreau[2] proposed a much more complicated method He precipitates the strychnine and part of the brucine by addition of a large excess of ferrocyanide in weakly acid medium The precipitate is treated with an excess of ammonia and the free alkaloids are extracted with chloroform After evaporation of the solvent the alkaloids are dissolved in 0 1*N* hydrochloric acid and the precipitation with ferrocyanide repeated as before The process is repeated three times and the final precipitate of strychnine hydroferrocyanide weighed after drying over sulphuric acid and finally in an oven

---

* Scientific Section, A Ph A, Madison meeting, 1933

[1] Beckurts and Holtz *Pharm Zentralhalle*, 28 (1887), 119

[2] Gadreau *J pharm chim* [6] 4 (1927) 145

In this study the properties of strychnine and brucine hydroferrocyanide have been investigated and a simple procedure developed for the determination of strychnine in the presence of brucine

MATERIALS USED

Brucine Hydrochloride—Commercial brucine was dissolved in chloroform and treated with gaseous hydrochloric acid The hydrochloride was allowed to crystallize and was recrystallized from alcohol containing 20% acetone The aqueous solution of the salt was standardized by gravimetric chloride determinations In other experiments a solution of the salt was obtained by dissolving a known amount of brucine recrystallized from acetone and alcohol in a slight excess of hydrochloric acid

Strychnine Sulphate—A Merck & Company product was used without further purification It appeared to be the normal salt *i e* containing one molecule of strychnine per one molecule of sulphuric acid The aqueous solution was standardized by titration with sodium hydroxide, using methyl red as indicator In addition the sulphate was determined gravimetrically as barium sulphate, the results obtained in the two methods agreed within 0 2% and were 0 4% lower than those calculated from the weight of the salt taken assuming the latter to be pure

Potassium Ferrocyanide—A C P product was twice recrystallized from water and dried over deliquescent sodium bromide Solutions of this salt in conductivity water were used and stabilized by the addition of 0 2% of sodium carbonate

COMPOSITION OF THE HYDROFERROCYANIDES OF STRYCHNINE AND BRUCINE

The hydroferrocyanides of both alkaloids were prepared by precipitation from strongly acid medium (*v i*) with an excess of potassium ferrocyanide The precipitates were washed with water and air dried The water content was determined by heating 0 5- to 0 8 Gm samples in a vacuum oven at 60° until constant weight was obtained Upon continued drying at 110° no further loss in weight was found with the strychnine hydroferrocyanide It is not recommended to heat the air-dry precipitates directly at 110°, since a decomposition, especially of the brucine compound, takes place The hydroferrocyanide content of the precipitates was determined by titration of the aqueous suspensions with sodium hydroxide, using methyl red as indicator The results showed that the air-dry hydroferrocyanides have the following composition

$C_{21}H_{22}N_2O_2\ H_4Fe(CN)_6\ 1\ H_2O$ M = 568 1
strychnine hydroferrocyanide

$C_{23}H_{26}N_2O_4\ H_4Fe(CN)_6\ 2\ H_2O$ M = 646 2
brucine hydroferrocyanide

W M Cumming[1] reports a similar composition, but with two molecules of water of crystallization for the strychnine salt instead of one However, four water determinations made by us yielded a water content between 3 1 and 3 5% (theoretical for 1 H_2O, 3 17%, for 2 H_2O, 6 15%)

SENSITIVITY OF THE PRECIPITATION OF STRYCHNINE AND BRUCINE

The sensitivity is greatly dependent upon the acid concentration and to a lesser extent on the ferrocyanide content The original precipitates are white, but the brucine hydroferrocyanide turns green on standing over night in acid medium In the final procedure 1 cc 0 5 molar potassium ferrocyanide was added to 10-cc solution of the alkaloid salt containing the indicated amount of hydro-

[1] W M Cumming *J Soc Chem Ind*, 44 (1925), 110T

chloric acid The results are given in Table I It is seen that the sensitivity of the precipitation of strychnine in 0 1 to 0 5*N* hydrochloric acid is much larger than that of brucine At these acidities 0 07-mg strychnine can be detected in 10 cc of solution if observed after 30 minutes of standing The precipitation of this alkaloid, therefore, is quantitative The sensitivity of the precipitation of brucine is the greatest in 3*N* hydrochloric acid After 10 minutes of standing 3 mg of brucine in 10 cc of solution can be detected The data in the table also indicate that the precipitation of strychnine is much faster than that of brucine

TABLE I —SENSITIVITY OF PRECIPITATION OF STRYCHNINE AND BRUCINE

Concentration HCl *N*	Concentration Strychnine Moles p l	Result	Concentration Brucine Moles p l	Result
0	0 01	Trace ppt after 1 hr	0 02	No ppt after 2 hours
0 1	0 01	Immediate ppt	0 02	Ppt after 25 minutes
0 1	0 004	Ppt after 10 seconds	0 001	Ppt after 24 hours
0 1	0 0002	Ppt after 1–2 minutes		
0 1	0 0001	Ppt after 3–5 minutes		
0 1	0 00004	Ppt after 9 minutes		
0 1	0 00002	Slight ppt after 30 minutes		
0 5	0 0001	Ppt after 2 minutes	0 003	Ppt after 10 minutes
0 5	0 00004	Ppt after 9 minutes		
3			0 0008	Ppt after 5 minutes
3			0 0006	No ppt after 24 hours

SOLUBILITY OF STRYCHNINE AND BRUCINE HYDROFERROCYANIDES

The solubility was determined by shaking a known weight of the salt for 45 minutes with a known volume of solvent Longer shaking is not desirable since decomposition may take place The solid was collected and washed quickly with small portions of alcohol and ether, and weighed after 20 minutes' drying in the air

TABLE II —SOLUBILITY OF STRYCHNINE AND BRUCINE HYDROFERROCYANIDE (TEMPERATURE 25° ± 2°)

Solvent	Strychnine Hydroferrocyanide Dissolved Mg per 100 Cc	Brucine Hydroferrocyanide Dissolved Mg per 100 Cc
Water	36	237
0 1*N* HCl	3 7	52
1*N* HCl		50[a]
3*N* HCl	4 2	78

[a] Temperature was 21°

GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF STRYCHNINE AS HYDROFERROCYANIDE

Procedure —To a measured volume of the strychnine solution water and so much hydrochloric acid is added that the concentration is 0 1 to 1*N* in a final volume of 100 cc Five cc 0 5 molar potassium ferrocyanide are added slowly from a pipette resulting in the rapid formation of a nicely crystalline precipitate After 30 minutes of standing and occasional stirring the precipitate is filtered on a sintered glass crucible (1 G –4), washed 5 to 6 times with approximately 0 1*N* hydrochloric acid, followed by two or three washings with alcohol and two or three washings with ether Air is aspirated through for a few minutes and the crucible weighed after 20–30 minutes' standing in the air The strychnine hydroferrocyanide $C_{21}H_{22}N_2O_2\ H_4Fe(CN)_6\ H_2O$ contains 58 83% strychnine

TABLE III —GRAVIMETRIC DETERMINATION OF STRYCHNINE

Strychnine Taken Gm	HCl N	Weight Ppt Gm	Strychnine Found Gm	Error %
0 3384[a]	0 1	0 5680	0 3342	−1 3
0 3384[a]	0 1	0 5673	0 3337	−1 4
0 3384	0 1	0 5764	0 3391	+0 2
0 3384	0 1	0 5756	0 3386	+0 05
0 3384	0 1	0 5760	0 3389	+0 1
0 3384	1	0 5767	0 3393	+0 3
0 1066	1	0 1813	0 1067	+0 1
0 0677	1	0 1150	0 0677	0 0

[a] Washed with water instead of 0 1*N* hydrochloric acid

Table III shows that the procedure gives excellent results The concentration of the strychnine in the last example in the table was only 0 002 molar and still the theoretical yield of precipitate was found

VOLUMETRIC DETERMINATION OF THE STRYCHNINE HYDROFERROCYANIDE

Since the gravimetric determination of strychnine is so extremely simple, there is not much use for a volumetric determination of the precipitate If very small quantities of strychnine have to be determined, a volumetric procedure may be of some advantage The strychnine hydroferrocyanide can be titrated with sodium hydroxide If methyl red is used as indicator, the end-point is determined by the following reaction

$$BH\ H_3Fe(CN)_6 + 3OH^- \longrightarrow BH^+ + Fe(CN)_6 \equiv + 3\ H_2O$$

The color change from red to yellow is not very sharp since strychnine is a relatively weak base and the fourth ionization constant of hydroferrocyanic acid is of the order of 10^{-4} Still the color change to yellow can be seen with an accuracy of 0 1 cc 0 05*N* base

The same procedure was followed as described for the gravimetric determination except that a Gooch crucible with a paper disc was used to collect the precipitate After washing with alcohol the precipitate and paper mat were transferred to a flask and treated with 50 cc of water and the suspension titrated with carbonate free sodium hydroxide, using methyl red as indicator The precipitate dissolves gradually as the titration proceeds 1 cc 0 1*N* sodium hydroxide is equivalent to 11 14 mg of strychnine The data in Table IV show that the results are about 1 to 3% low In the last example the concentration of the strychnine in the original solution was only 0 0008 molar

TABLE IV —VOLUMETRIC DETERMINATION OF THE PRECIPITATE

Strychnine Taken Gm	HCl N	0 052*N* NaOH Used Cc	Strychnine Found Gm	Error %
0 2714	1	44 91	0 2642	−2 7
0 2714	3	44 70	0 2630	−3 1
0 0678	1	11 38	0 0670	−1 2
0 0678	3	11 30	0 0665	−1 9
0 0271	1	4 38	0 0258	−4 8

GRAVIMETRIC DETERMINATION OF BRUCINE

The same procedure was followed as described for strychnine except that the acidity was 1 to 3*N* with respect to hydrochloric acid in the final volume, filtration

made after standing for at least one hour, and the precipitate quantitatively transferred to the crucible by means of the first filtrate If dilute hydrochloric acid is used for this purpose, the results are markedly low on account of solubility loss After the precipitate is transferred to the crucible, it is washed 2 to 3 times with 2- to 3-cc portions of 0 1*N* hydrochloric acid and finally with alcohol and ether The rate of precipitation of brucine is much slower than that of strychnine, in the examples given in the table precipitation began after a few minutes' vigorous stirring The results in Table V show that the determination of brucine as hydro ferrocyanide is not as accurate as that of strychnine

TABLE V —GRAVIMETRIC DETERMINATION OF BRUCINE

(0 1314 Gm brucine taken precipitate contains 61 00% brucine)

HCl *N*	Time before Filtration Hours	Weight Ppt Gm	Brucine Found Gm	Error %
3[a]	1/6	0 1994	0 1216	−7 5
3[a]	1	0 1997	0 1218	−7 3
1	1	0 2103	0 1283	−2 4
3	1	0 2120	0 1293	−1 6
1	20	0 2119	0 1293	−1 6
3	20	0 2108	0 1286	−2 1

[a] Precipitate transferred to crucible with 0 1*N* HCl instead of with filtrate

It may be mentioned that the results were 2 to 4% high if 25 to 50 cc of 0 5 molar ferrocyanide was used instead of 5 cc Coprecipitation of potassium does not account for these high results

DETERMINATION OF STRYCHNINE IN THE PRESENCE OF BRUCINE

Use has been made of the smaller solubility of strychnine hydroferrocyanide and its greater speed of precipitation as compared with the corresponding brucine compound in the separation of strychnine from brucine

SINGLE PRECIPITATION APPROXIMATE PROCEDURE

The mixture of the two alkaloids is diluted with water and hydrochloric acid to a volume of 50 cc and an acidity of 1 to 2*N* The solution is titrated with 0 025 molar potassium ferrocyanide until all of the strychnine has been precipitated as indicated by testing with ferric chloride paper This test is made by immersing a narrow, pointed strip of filter paper into the solution The end of the paper which has been dipped in the solution is then torn off and a drop of ferric chloride solution placed near the rim of the wet spot The indicator solution diffuses by capillary action and a bluish zone is formed at the junction in the presence of an excess of ferrocyanide The end-point is not very sharp, and its detection requires some practice, an excess of 0 5 to 0 6 cc of the ferrocyanide solution being required to make the color change visible The mixture is allowed to stand for 10 to 15 minutes The precipitate is then collected on a sintered glass crucible and further treated as described before in the gravimetric determination of strychnine

The results in Table VI show that the acidity of the solution may be varied between 1 and 3*N* and that 100 mg of strychnine can be determined in the presence

of the same amount of brucine with an accuracy of about 1 to 3% As a rule high results are found owing to precipitation of some brucine This error increases rapidly with increasing excess of ferrocyanide, for this reason it is safer to apply the double precipitation method as described below

TABLE VI —SINGLE PRECIPITATION OF STRYCHNINE IN THE PRESENCE OF BRUCINE

(0 1066 Gm strychnine taken in all experiments Titrated with 0 0238 molar $K_4Fe(CN)_6$ Theoretical amount of reagent required for complete precipitation of strychnine is 13 4 cc)

Brucine Present Gm	HCl N	$K_4Fe(CN)_6$ Added Cc	Time of Standing before Filtration Minutes	Weight Precipitate Gm	Strychnine Found Gm	Error %
0	1	14 0	5	0 1782	0 1048	−1 7
0	1	14 2	10	0 1782	0 1048	−1 7
0	1	14 2	15	0 1788	0 1052	−1 3
0 066	1	14 0	5	0 1782	0 1048	−1 7
0 066	1	14 2	15	0 1870	0 1100	+3 2
0 066	3	14 2	15	0 1853	0 1090	+2 3
0	3	14 2	15	0 1794	0 1056	−0 9
0 131	3	14 2	15	0 1838	0 1081	+1 4
0 131	3	14 2	15	0 1864	0 1097	+2 9
0 131	3	15 0	15	0 1905	0 1121	+5 2

DOUBLE PRECIPITATION

The mixture is brought to a volume of about 50 cc and a hydrochloric acid concentration of about 3*N* The solution is then titrated with 0 025 molar potassium ferrocyanide until a distinct excess (about 15 to 20%) is present as indicated by the ferric chloride test The precipitate is filtered after 15 minutes' standing on a Gooch crucible with paper mat and washed once with a small volume of 0 1*N* hydrochloric acid It is then transferred back into the original precipitation flask and treated with 40 to 50 cc water and about 1*N* ammonia until the precipitate is dissolved A slight excess of ammonia is not harmful but gives rise to the formation of the free alkaloid Five cc of concentrated or 10 cc of 6*N* hydrochloric acid are added The precipitate formed is allowed to stand for 15 minutes, collected in a sintered glass crucible (1 G –4) and further treated as described under the gravimetric determination of strychnine

TABLE VII —DOUBLE PRECIPITATION OF STRYCHNINE IN THE PRESENCE OF BRUCINE

(0 1066 Gm of strychnine and 0 2 Gm of brucine in all experiments)

Excess 0 025 Molar $K_4Fe(CN)_6$ in First Ppt %	Second Precipitation Volume	HCl N	Weight Ppt Gm	Strychnine Found Gm	Error %
12	50	0 2	0 1711	0 1007	−5 5
12	50	1	0 1780	0 1047	−1 8
20	50	1	0 1832	0 1078	+1 1
20	50	1	0 1785	0 1050	−1 5
20	50	1	0 1806	0 1062	−0 4
20	125	1	0 1823	0 1072	+0 6
20	125	1	0 1806	0 1062	−0 4
20	125	1	0 1767	0 1040	−2 4
20	125	1	0 1764	0 1038	−2 6

The results in Table VII show that 100 mg of strychnine can be determined in the presence of double the amount of brucine with an accuracy of about 1%

It is suggested that the methods described may be advantageously applied to the direct determination of strychnine and brucine in strychnos preparations First the sum of the two alkaloids could be determined by precipitation in acid medium with an excess of potassium ferrocyanide The weighed precipitate then might be decomposed with ammonia and the strychnine determined as described above

SUMMARY

1 The sensitivity of the precipitation of strychnine and brucine in hydrochloric acid medium with hydroferrocyanide has been determined

2 Strychnine can be determined with great accuracy by precipitation as hydroferrocyanide The precipitate is weighed in the air-dry form The method yields quantitative results even at great dilutions The determination of brucine is less accurate owing to the greater solubility of its hydroferrocyanide

3 A simple method is described for the quantitative determination of strychnine in the presence of brucine It is based on the fact that the hydroferrocyanide of strychnine is less soluble and is formed more rapidly than that of brucine

SCHOOL OF CHEMISTRY OF THE UNIVERSITY OF MINNESOTA,
MINNEAPOLIS, MINNESOTA

THE ARSENIC CONTENT OF CHONDRUS *

BY CHARLES H LAWALL AND JOS W E HARRISSON

In 1931 and 1932 we conducted an investigation of the sulphur dioxide content of Chondrus, which was reported in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, Vol XXI, No 11, November 1932, page 1146

In this paper we showed that sulphur dioxide is not a normal constituent of natural chondrus as had been claimed, and that chondrus of European origin as sold in America was invariably contaminated with sulphur dioxide as a result of the "sulphur bleaching" process to which it is exposed before shipment to America, and that the natural chondrus shows no evidences of sulphur dioxide when subjected to tests for that adulterant by the methods of the A O A C

In view of the fact that the European samples might possibly have been bleached with arsenic containing sulphur, it seemed advisable to make a further investigation of the samples to ascertain the arsenic content

As we had sufficient amount of all but one of the samples in question, we undertook the investigation and report the results herewith

The method followed was that of the A O A C Methods of Analysis, page 306, 3rd Edition

The preliminary procedure was as follows

Ten Gm of chondrus were digested with 25 cc of sulphuric acid and a total of 30 cc of nitric acid After the organic matter had been destroyed and the digestion was complete the remaining liquid was diluted to 100 cc and 10 cc of this liquid was used for each determination

The laboratory numbers, sources of the samples and sulphur dioxide content are repeated from the previous article

* Scientific Section, A PH A , Madison meeting 1933

The following results were obtained, the figures being the average of closely agreeing duplicates

Lab No	Source	SO_2 p p m	As_2O_3 p p m
33469	Wholesale Drug House	1260	6
33641	Wholesale Drug House	920	7
33642	Wholesale Drug House	4040	11
33705	Importing House ' Technical'	4080	3
33706	Importing House 'Medicinal"	2520	3 5
33902	Natural—before drying	none	12
33903	Natural—after first drying	none	10
33904	Natural—ready for shipment	none	8
33772	Natural—after 4 hrs drying	none	9
33773	Natural—after 2 days sun bleaching	none	10
33774	Natural—after 6 days sun bleaching	none	2
33775	Natural—in finished condition	none	5

Two other specimens were added to the list for investigation One was a sample of genuine natural chondrus imported from Ireland, and the other was an Irish Moss Pudding made from this same material

There was not sufficient of either of these samples to make sulphur dioxide determinations but the arsenic trioxide content of the chondrus itself was found to be 4 p p m and of the pudding 0 11 p p m

Upon studying these results it will be seen, *first*, that the arsenic content does not parallel the sulphur dioxide content, *second*, that the arsenic content of natural chondrus averages slightly higher than that of sulphur-bleached chondrus, the average for the natural being 7 5, while that of the sulphur-bleached is 6 1, *third*, that the arsenic content of every sample, whether natural or bleached is in excess of the tolerance of 1 4 p p m established for arsenic in food products, and *fourth*, that the content of arsenic is not uniform, even in samples from the same locality

In view of the wide variations in the arsenic content in samples from the same locality and in the same "collection" after the usual methods of handling, it was thought that possibly the arsenic content was due to adhering impurities and foreign matter In further investigation of this fact one of the samples of which a considerable quantity was still available, was carefully garbled, removing all portions of shell as well as sand and adhering foreign matter The garbled material was finely ground and subjected to examination for the arsenic content in comparison with the arsenic content of the impurities removed by garbling

The following results were obtained

	As_2O_3 p p m
Arsenic content of original sample	12 5
Arsenic content of garbled chondrus	12 5
Arsenic content of foreign matter removed by garbling	2 0

Our conclusions are that genuine unbleached or sun-bleached chondrus contains arsenic naturally, and that the arsenic content is well in excess of the tolerance for arsenic in food products

LABORATORIES OF LAWALL AND HARRISSON,
PHILADELPHIA, PA

COPTIS OCCIDENTALIS SALISBURY (FAM RANUNCULACEÆ) WESTERN COPTIS WESTERN GOLDTHREAD [1]

BY CHARLES E MOLLETT[2] AND B V CHRISTENSEN [3]

INTRODUCTION

Since large quantities of *Coptis occidentalis* are found growing in the mountains of northwestern Montana and northeastern Idaho, this investigation was made to determine the comparative medicinal value of this with that of the official *Coptis trifolia* found chiefly in eastern United States

REVIEW OF LITERATURE

The first description of the plant, which was later to bear the genus name *Coptis*, was by Halenius (probably a student of Linnæus), who placed it with the Hellebores and named it *Hellebore* or *Helleborus Trifolius* (4) It was so-called by subsequent botanists until it was separated from the Hellebore family by Salisbury, who described the plant in 1807 and created the genus *Coptis* and named it *Coptis trifolia* (4)

The species name, according to Latin nomenclature, should have been *trifoliata*, but according to present accepted procedures, the first name stands as the species name However, in some cases as in "Flora of the Rocky Mountains and Adja cent Plains ' (3) the species name *trifoliata* is still used

The genus name *Coptis* is taken from the Greek word *Kopo*, which means "to cut," from the cut or laciniated leaves of the hardy perennial plants of the Northern Hemisphere (1) According to the Index Kewensis, in the northern hemisphere this genus at present is composed of at least ten different species Foreign species given in "Index Kewensis" are *anemonæfolia*, *brachypetalæ*, *orientalis*, *quin quefolia*, *japonica* and *trifoliata* (19) C *quinquefolia* var *trifoliata*, *teeta* of the *Himalayas*, *chinensis* of China, *ospriocarpa* of India, and *marii* of Formosa

Of the North American species, Index Kewensis had, up to 1925, recognized only *trifolia*, *occidentalis*, *venosa* and *asplenifolia*

Following the description of trifolia in 1807, by Salisbury, a new species (*C occidentalis*) was described by Nuttall in 1838, which for some time represented the plants found growing in the northwest

Nuttall also split the genus *Coptis*, into Coptis and *Chrysocoptis*, on the basis of one flowered and ternately divided leaves for *C trifolia* and 2–4 flowered and pinnately divided leaves for *C occidentalis*, as representing the new genus *Chry socoptis* This latter genus has not been accepted by Index Kewensis as such, but is accepted as a synonym for *Coptis occidentalis*

---

[1] Investigation carried out in Laboratory of Pharmacognosy, College of Pharmacy, Uni versity of Florida

[2] Dean College of Pharmacy University of Montana

[3] Professor of Pharmacognosy and Pharmacology, University of Florida

AUTHOR S NOTE More work is being done upon the plants growing in Montana and gathered in various locations and at various altitudes as well as at different times of the year, the results to be published later in an additional paper

Nuttall further divided the species of the west into *C occidentalis* and *C lacinata*, on the basis of the size of the leaflets, their lobes and incisions as described by Charles V Piper in "Flora of Washington," 1906, page 276

The species *Coptis trifolia* is the only one which has ever been official in either the United States Pharmacopœia or the National Formulary, and is at present official in the National Formulary V under the name Coptis, Synonym, Goldthread, Botanical name, *Coptis trifolia*, Family, *Ranunculaceæ* (13) The entire plant is official (and consists usually of a nearly equal mixture of rhizomes and pressed leaves) (6)

The habit, range and habitat of *C trifolia* is given as follows A low perennial growing in moist woods and swamps of northeastern United States and Canada extending westward to Alaska (6) woods and swamps of northeastern North America south to Maryland mountains of North Carolina and Tennessee, and northeast Iowa (5) Northern United States and Canada in dark shady moist woods (8), in morasses of Canada and Siberia, Lapland and Kamchatka (4) damp mossy woods and bogs Newfoundland to Minnesota British Columbia and to the Alleghanies in North Carolina (7) woods and bogs of Greenland, Maryland Minnesota British Columbia Alaska and Eurasia (3)

BOTANICAL DESCRIPTION AND HABITAT

Descriptions and ranges of *Coptis* species, said to be growing in the Northwest, are as follows (12)

Herbs perennials low glabrous root stalks creeping Leaves ternately compound Flowers white, solitary or few on naked scapes Sepals 5–7 petal-like deciduous white or greenish Petals 5–6 small, linear cucullate Stamens 10–25 follicles 3–12 (Gk *Kopto* to cut, from the divided leaves)

A Leaflets obscurely 3 lobed, sepals oval or oblong obtuse petals enlarged at the summit West of the Cascade Mountains and east of the Cascade Mountains

AA Leaflets rather deeply lobed or segmented, sepals linear or ligulate attenuate, petals enlarged near the middle

B Leaves ternate

C All three leaflets long, petioluled leaf divisions obtuse, obtusely dentate seed oblong In the Cascades East of the Cascades (See Fig 1 *Coptis occidentalis*)

CC Middle leaflet long petioled lateral short petioluled leaf divisions acute, acutely dentate, seed oval West of the Cascades In the Cascades—*C lacinata*

BB Leaves pinnately 5 foliate West of Cascades—*C asplenifolia*

Fig 1—*Coptis occidentalis* Flowering plant Note three flowers Collected at Noxon, Montana May 1931

There is some doubt as to the range of *C trifolia* (3) (12), but no disagreement as to the range of *C occidentalis* growing only in northwestern United States

The plants, from which the rhizomes and rootlets were used in this investigation, were found growing in damp mossy and boggy woods of western Montana They are usually found in damp ravines and swampy woods, where the Arbor Vitæ (*Thuja plicata*) thrives Their range extends from the Bitter Root Mountains where the woods are not so moist, to the moist woods of the northwest ridges along the Continental Divide, which pass over the boundary into Canada *C occidentalis* is much smaller, with thin, paper-like leaves, in its southern range in the Bitter Root Mountains, than it is on the extreme northern border extending into Canada, where it is large and coarse The plants reach their largest size in the high, moist ravines, west of the Continental Divide, extending into Idaho

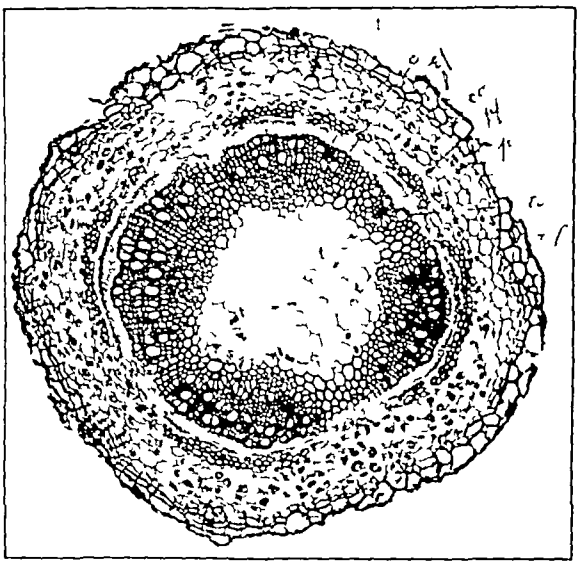


Fig 2—*Coptis occidentalis* Transverse section of rhizome × 60—*Ep*, epidermis, *h*, hypodermis, *co*, cortex, *pf*, pericyclic fibres, *p* phloem, *c*, cambium, *tr* tracheæ, *wf*, wood fibres in xylem, *m* pith

The official plant is collected while in flower, in May or June (5) Plants growing in Montana flower in April and May, putting up their pale, yellowish white flower while the ground is usually still frozen and covered with snow, this, and the pale, yellowish white color of the flowers, have given it the local name of "Snow Flowers" It is the first flower to appear in the springtime (near Noxon), in the mountains of western Montana, where the roots under investigation were obtained Climatic conditions in Montana make it impossible to gather the rhizomes and rootlets while in flower, as it blossoms while the ground is usually frozen and covered with snow It is not necessary to gather the entire plant of the western species as the rhizomes are twice as large as those of trifolia of the northeastern United States Using only the rhizomes and rootlets raises the medicinal quality of the drug, as the over-ground portion of the plant contains less of the alkaloids than the rhizomes and rootlets

This plant found growing in northwestern Montana, and northeastern Idaho corresponds with the description of *Coptis occidentalis* (Nuttall) (3), (13), and of *Chrysocoptis occidentalis* (Nuttall) (10)

EXPERIMENTAL PROCEDURE

Pharmacognosy—The rhizomes and rootlets were gathered in the fall, washed free from soil and leaf mold and dried The sample was reduced to a No 20 powder by first grinding the easily reduced portion to the required fineness in a Wyley mill and the remaining woody portion finished to the desired degree of fineness in a chaser mill and the whole mixed thoroughly

A portion of the powdered drug after being irrigated with alcohol, exhibited under the

microscope, characteristics similar to those found in *Coptis trifolia*, but the cells were larger and their walls were thicker and the starch grains larger and more numerous (5*b*) (6) (13) (16)

Scrapings from the rhizomes of *Coptis occidentalis* in water mounts under the microscope (5*a*), revealed starch grains, simple or occasionally 2–3 compound the single grains 16$^{\mu}$ in diameter and varying from spheroidal, ovoid, oblong, spindle shaped sub reniform concavo convex to irregular in form with a central to occasional excentric hilum, the latter frequently 2 to several cleft to crescent shaped the lamellæ being distinct in some of the larger grains

Most of the individual starch grains were up to 8$^{\mu}$ in diameter

The dried rhizomes were fixed by the usual method (5*a*), imbedded in celloidin and sections made

Transverse sections through the internode of the rhizome showed the following histological structures

1 A prominent large celled epidermis with thick suberized outer walls

2 A hypodermis of clear cells which undergo tangential division in the older rhizomes forming a cork cambium which begins to lay down subepidermal cork on its outer face

3 A region of from 5 to 7 layers of starch and alkaloid containing cortical parenchyma cells with thin walls The innermost layer of this region or endodermis did not differ in appearance from the other layers

4 A pericycle of several layers containing an interrupted circle of lignified pericyclic fibre groups which alternate with starch and alkaloid containing parenchyma

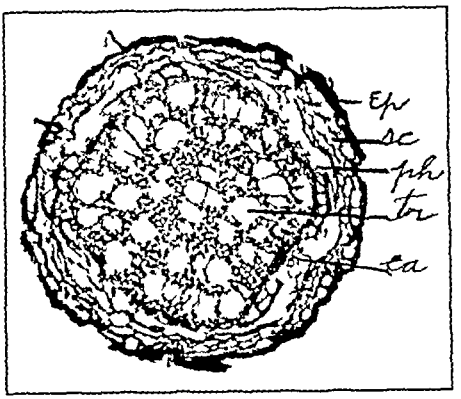


Fig 3—*Coptis occidentalis* Transverse section of rootlet × 68—*Ep*, epidermis, *sc*, secondary cortex, *ph*, phloem, *ca* cambium *tr*, tracheæ of xylem

5 A circle of up to about 15 to 17 open collateral fibrovascular bundles which are separated from each other by narrow medullary rays with lignified walls The phloem of these bundles is composed largely of sieve tubes and the xylem largely of tracheæ and wood fibres

6 A large central pith composed of thin walled parenchyma containing starch

Berberine was most abundant in the parenchyma cells (5)

Longitudinal radial sections showed the tracheæ to be mostly bordered pored with circular to elliptical bordered pits Some spiral tracheæ were evident in the protoxylem The bordered pored tracheæ measured were up to 32 microns in diameter Their end walls were oblique and porous

The wood fibres and pericyclic fibres possess lignified walls with porous slits and pointed ends, the lumen being broader than the walls

Both the cortical and pith parenchyma cells are elongated longitudinally The chief differences noted between the sections studied of the rhizomes of this species and *C trifolia* were

1 The more extensive and less spongy pith in *C occidentalis* than in *C trifolia*

2 The presence of a cork cambium and beginning deposition of cork tissue in *C occidentalis* and its absence in *C trifolia*

3 The absence of a distinct endodermis in this species and its presence in *C trifolia*

4 The presence of sclerenchyma fibres in the pericycle of *C occidentalis* and their absence of in the pericycle of *C trifolia*

5 The more extensive development of the xylem in *C occidentalis* than in *C trifolia*

6 A larger number of root systems emanate from the rhizome of *C occidentalis* than in *C trifolia*

A small sample of the drug was first extracted with ether and then with alcohol Each of these extracts contained alkaloids according to U S P X alkaloidal precipitation tests

The marcs from the above extracts were further extracted with dilute alcohol and this extract tested for alkaloids with negative results (The residue from the ether extraction was of a light yellow color, that from the alcohol was copious and of a dark red color)

These preliminary tests suggested a method of analysis as follows A sample of the powder was weighed out and placed in a Soxhlet extraction apparatus, macerated for several hours and extracted with anhydrous ether until exhausted the extract removed and evaporated spontaneously, cooled and dried to a constant weight in a desiccator (See Table I) The marc from the ether extraction was removed and dried and then exhausted with absolute alcohol The alcoholic percolate was evaporated to dryness at a low temperature on a water-bath, cooled and dried in a desiccator to constant weight (See Table I)

The residue from the ether extraction was of a pale greenish yellow color The residue was dissolved in hot alcohol, thrown into ten times its volume of distilled water, acidulated with dilute hydrochloric acid and the oily resinous precipitate collected on a filter The precipitate gave an oily stain and was resinous to the touch, completely soluble in warm sodium hydroxide solution and partly soluble in 80% alcohol, showing oil and resin The filtrate from the oily resinous precipitate was made slightly alkaline with ammonia water and the precipitate shaken out with ether and the ether evaporated spontaneously, which left colorless crystalline plates, which gave a purplish color when first heated with sulphuric acid (5) This indicated the precipitate was probably Coptine Further tests confirmed this and percentage yield was found to be as shown in Table I

The residue from the alcohol extraction was dissolved in a small amount of hot water and strongly acidulated with hydrochloric acid, filtered and set aside over night A copious deposit of bright yellow needle-shaped crystals formed These were filtered, the mother liquor concentrated and more hydrochloric acid added and the solution heated to the boiling point and again set aside over night The resultant crystals were added to those previously collected, the whole recrystallized from hot water and collected upon counter-balanced filters, interposed, dried in a desiccator and weighed The crystals were found to be insoluble in ether, soluble in water and alcohol, and were of a bright yellow color and needle shaped, corresponding to Berberine hydrochloride (11) For percentage yield see Table I

Samples of the powdered drug were placed in crucibles and incinerated according to the methods of the U S P X The ash was further treated by U S P X method to determine the acid-insoluble ash Results given in Table I

The larger portion of the insoluble ash was found to be silica (16) The soluble portion subjected to qualitative analyses gave tests for iron, aluminum, calcium, magnesium and potassium An aqueous extract of the powder also showed the presence of gallic and tannic acids, sugar, albumin and coloring matter

Coptis trifolia yields 3 75 to 5 25% total ash, of which about one-tenth is silica, with iron, aluminum, calcium, magnesium and potassium present (6) (See Table I)

Tests on the aqueous extract of *Coptis trifolia* showed the presence of tannic acid, gallic acid, starch, sugar, oil and resin, albumin and coloring matter

TABLE I—SHOWING COMPARATIVE ANALYSES OF *C occidentalis* AND *C trifolia*

	Coptis occidentalis	*Coptis trifolia*
Ether extractive	2 65 %	2 275%
Alcohol extractive	19 2 %	26 27 %
Total ash	4 39 %	4 35 %
Acid insoluble ash	0 490%	0 39 %
Coptine	0 31 %	0 3 %
Berberine	4 6 %	3 0 %

Therapeutics—The various species of *Coptis* are said to contain from 4% to 8% of Berberine (19), to which its principal action is said to be due It is said by recent authorities to be a simple bitter tonic, although it was formerly extensively used to heal aphthous sores in the mouth, as well as for various eye inflammations

A 100% glycerite, made by preparing the fluidextract in the usual way, evaporating off the alcohol and making up to the original volume with glycerin, has given good results, when applied to aphthous and other scores in the mouth

Since *C occidentalis* contains the same constituents and about the same percentage of such constituents as *C trifolia*, it appears logical that the medicinal effects of *C occidentalis* should be equal and similar to those of *C trifolia* For this reason and because of the abundance of *C occidentalis* in Montana and Idaho, it is suggested that *C occidentalis* be included with *C trifolia* in N F VI

CONCLUSIONS

1 Analysis indicates that *C occidentalis* contains the same active constituents in about the same amounts as *C trifolia*

2 For this reason and because of the abundance of *C occidentalis* in Montana and Idaho, it is suggested that *C occidentalis* be included with *C trifolia* in N F VI

3 *C occidentalis*, because of its abundance and convenient collection, is suggested as a commercial source of the alkaloids Coptine and Berberine in preference to *C trifolia*

BIBLIOGRAPHY

(1) L H Bailey, "Standard Cyclopedia of Horticulture" Vol 1, page 841
(2) Hooker and Jackson 'Index Kewensis"
(3) P A Rydberg, 'Flora of the Rocky Mountains and Adjacent Plains" 2nd Edition (1917), 304
(4) Bigelow, "Medical Botany, Vol 1, page 60
(5) (*a*) H W Youngken, Pharmaceutical Botany," 5th Edition (1930) 42–46, 95 (*b*) H W Youngken, 'Pharmacognosy," 5th Edition (1930), 258–260
(6) Kramer's Scientific and Applied Pharmacognosy," 3rd Edition Newcomb, Darbaker, Gathercoal and Fischer (1928), 223
(7) 'Merck's Index' 3rd Edition (1930), 188
(8) Washburn and Blome Pharmacognosy" (1927), 166
(9) John K Small 'Flora of the Southeastern United States" 2nd Edition (1913), 431
(10) Charles V Piper Flora of Washington, Contributions to U S National Herbarium,' Vol II (1916) 378
(11) Charles F Millspaugh, American Medicinal Plants" Vol 1, 15–3
(12) Frye and Rigg, Elementary Flora of the Northwest" (1914) 97

The marcs from the above extracts were further extracted with dilute alcohol and this extract tested for alkaloids with negative results (The residue from the ether extraction was of a light yellow color, that from the alcohol was copious and of a dark red color)

These preliminary tests suggested a method of analysis as follows A sample of the powder was weighed out and placed in a Soxhlet extraction apparatus, macer ated for several hours and extracted with anhydrous ether until exhausted the extract removed and evaporated spontaneously, cooled and dried to a constant weight in a desiccator (See Table I) The marc from the ether extraction was removed and dried and then exhausted with absolute alcohol The alcoholic per- colate was evaporated to dryness at a low temperature on a water-bath, cooled and dried in a desiccator to constant weight (See Table I)

The residue from the ether extraction was of a pale greenish yellow color The residue was dissolved in hot alcohol, thrown into ten times its volume of dis tilled water, acidulated with dilute hydrochloric acid and the oily resinous pre cipitate collected on a filter The precipitate gave an oily stain and was resinous to the touch, completely soluble in warm sodium hydroxide solution and partly soluble in 80% alcohol, showing oil and resin The filtrate from the oily resinous precipitate was made slightly alkaline with ammonia water and the precipitate shaken out with ether and the ether evaporated spontaneously, which left colorless crystalline plates, which gave a purplish color when first heated with sulphuric acid (5) This indicated the precipitate was probably Coptine Further tests confirmed this and percentage yield was found to be as shown in Table I

The residue from the alcohol extraction was dissolved in a small amount of hot water and strongly acidulated with hydrochloric acid, filtered and set aside over night A copious deposit of bright yellow needle-shaped crystals formed These were filtered, the mother liquor concentrated and more hydrochloric acid added and the solution heated to the boiling point and again set aside over night The re sultant crystals were added to those previously collected, the whole recrystallized from hot water and collected upon counter-balanced filters, interposed, dried in a desiccator and weighed The crystals were found to be insoluble in ether, soluble in water and alcohol, and were of a bright yellow color and needle shaped, corre sponding to Berberine hydrochloride (11) For percentage yield see Table I

Samples of the powdered drug were placed in crucibles and incinerated ac cording to the methods of the U S P X The ash was further treated by U S P X method to determine the acid-insoluble ash Results given in Table I

The larger portion of the insoluble ash was found to be silica (16) The soluble portion subjected to qualitative analyses gave tests for iron, aluminum, calcium, magnesium and potassium An aqueous extract of the powder also showed the presence of gallic and tannic acids, sugar, albumin and coloring matter

Coptis trifolia yields 3 75 to 5 25% total ash, of which about one-tenth is *silica, with iron, aluminum, calcium, magnesium and potassium* present (6) (See Table I)

Tests on the aqueous extract of *Coptis trifolia* showed the presence of tannic acid, gallic acid, starch, sugar, oil and resin, albumin and coloring matter

TABLE I —SHOWING COMPARATIVE ANALYSES OF *C occidentalis* AND *C trifolia*

	Coptis occidentalis	*Coptis trifolia*
Ether extractive	2 65 %	2 275%
Alcohol extractive	19 2 %	26 27 %
Total ash	4 39 %	4 35 %
Acid insoluble ash	0 490%	0 39 %
Coptine	0 31 %	0 3 %
Berberine	4 6 %	3 0 %

Therapeutics —The various species of *Coptis* are said to contain from 4% to 8% of Berberine (19), to which its principal action is said to be due It is said by recent authorities to be a simple bitter tonic, although it was formerly extensively used to heal aphthous sores in the mouth, as well as for various eye inflammations

A 100% glycerite, made by preparing the fluidextract in the usual way, evaporating off the alcohol and making up to the original volume with glycerin, has given good results, when applied to aphthous and other scores in the mouth

Since *C occidentalis* contains the same constituents and about the same percentage of such constituents as *C trifolia,* it appears logical that the medicinal effects of *C occidentalis* should be equal and similar to those of *C trifolia* For this reason and because of the abundance of *C occidentalis* in Montana and Idaho, it is suggested that *C occidentalis* be included with *C trifolia* in N F VI

CONCLUSIONS

1 Analysis indicates that *C occidentalis* contains the same active constituents in about the same amounts as *C trifolia*

2 For this reason and because of the abundance of *C occidentalis* in Montana and Idaho, it is suggested that *C occidentalis* be included with *C trifolia* in N F VI

3 *C occidentalis*, because of its abundance and convenient collection, is suggested as a commercial source of the alkaloids Coptine and Berberine in preference to *C trifolia*

BIBLIOGRAPHY

(1) L H Bailey, 'Standard Cyclopedia of Horticulture " Vol 1, page 841
(2) Hooker and Jackson, ' Index Kewensis '
(3) P A Rydberg, ' Flora of the Rocky Mountains and Adjacent Plains ' 2nd Edition (1917), 304
(4) Bigelow, ' Medical Botany,' Vol 1, page 60
(5) (*a*) H W Youngken, "Pharmaceutical Botany," 5th Edition (1930), 42–46, 95 (*b*) H W Youngken, 'Pharmacognosy," 5th Edition (1930), 258–260
(6) ' Kramer's Scientific and Applied Pharmacognosy," 3rd Edition, Newcomb, Darbaker Gathercoal and Fischer (1928), 223
(7) 'Merck's Index " 3rd Edition (1930) 188
(8) Washburn and Blome, Pharmacognosy" (1927) 166
(9) John K Small, Flora of the Southeastern United States ' 2nd Edition (1913), 431
(10) Charles V Piper, 'Flora of Washington Contributions to U S National Herbarium " Vol II (1916), 378
(11) Charles F Millspaugh, 'American Medicinal Plants," Vol 1, 15–3
(12) Frye and Rigg, ' Elementary Flora of the Northwest" (1914), 97

(13) National Formulary, V (1926), 312
(14) Proceedings of the American Pharmaceutical Association, 24 (1876), 158
(15) Year Book, American Pharmaceutical Association, 4 (1915), 95
(16) E Z Gross, *American Journal of Pharmacy* (1873), 193
(17) Year Book, American Pharmaceutical Association, 15 (1926), 295
(18, 19) Proceedings of the American Pharmaceutical Association, 32 (1884), 151 and 171

THE ASSAY OF HYOSCYAMUS *

BY H G DEKAY[1] AND C B JORDAN

Hyoscyamus has been official in the past four revisions of the U S Pharmacopœia, and an assay process has been described in the last three The changes occurring in this assay have been primarily in that part of it dealing with the extraction of the alkaloids from the crude drug In the U S P VIII (first official process) the drug was macerated for 10 minutes with a mixture of 1 part of chloroform and 3 parts of ether, then ammonia water was added and the contents agitated during 1 hour The final extraction was made from a basic mixture by the use of chloroform

In the U S P IX, the process of extraction was changed as follows the drug was agitated during 2 hours with 300 cc of a mixture of 1 volume of chloroform and 3 volumes of ether to which ammonia water had been added An aliquot part of the immiscible solvent was then decanted and the assay completed as indicated in the first process The U S P X changed this to a percolation process, the same solvent being used

Various workers encountered many difficulties in the assay of this drug with the result that a number of processes have been presented for consideration during the past decade

Watkins and Palkin (1), workers in the Drug Control Laboratory, Bureau of Chemistry, U S Department of Agriculture, described a method for the assay of Hyoscyamus "which gave a yield of from two to three times as much alkaloid as that obtained by the U S P IX and X methods "

In order to check the various processes for the assay of Hyoscyamus, C B Jordan, Dean of School of Pharmacy, Purdue University, Chairman of Subcommittee No 6, U S P Revision Committee, submitted samples from the same lot of drug in No 60 powder to a number of experienced chemists for collaborative work He requested that three processes be used as follows Process No 1 (2), the U S P X process, process No 2, which was the same except that the drug was allowed to macerate over night, process No 3 (3), recommended by J J Durrett, who was, at that time, Chief, Drug Control, the U S Food and Drug Administration The last was a hot extraction process very much like that used by Watkins and Palkin (1) in their work with this drug This process required a special apparatus

---

* An abstract based upon a thesis by H G DeKay submitted to the Faculty of Purdue University in partial fulfilment of the requirements for the degree of Doctor of Philosophy

[1] Special worker for Sub-committee No 6 of the U S P Revision Committee

The following results were obtained (4) in terms of percentage of total alkaloids

Operator	Process No 1	Process No 2	Process No 3
1	0 072	0 098	0 168
2	0 0381	0 0442	0 092
3	0 0306	0 0345	0 0898
4	0 0535	0 0606	0 1108
5	0 0858	0 080	0 152
6	0 0381	0 0462	0 0722
7	0 072	0 063	0 131
8	0 088	0 109	0 137
9	0 090	0 1014	0 1014

The collaborators pointed out that in processes No 1 and No 2 difficulty was encountered during the acid extraction because of coloring matter which could not be removed by filtering They suggested that in process No 3 the small amount of alcohol used could explain the increase in yield of the alkaloid They also stated that it was extremely awkward to use the special apparatus for maceration and extraction and that the extractive was highly colored, making the end-point reading difficult

These reports indicated that it was difficult to obtain concordant results by either the first or the second processes and that the agreement in the third was far from satisfactory It is possible that the personal factor plays an important part, if so, an assay process should be devised that would reduce this factor to a minimum

The chairman of the Revision Committee received a definite recommendation from J J Durrett (3) regarding this assay process and the purity rubric of this drug It was passed on to the chairman of the Sub-committee on Crude Drug Assay The above-quoted results indicated to him that the whole question should be carefully studied, and this explains the assignment of the problem to H G DeKay, who had been working on the assay of Hyoscyamus for about twelve months

We believed that the higher results obtained by Watkins and Palkin, which we assumed was the basis for J J Durrett's recommendation, could be due to one or more of the following reasons *1* Failure of the U S P X process to extract all of the alkaloid, presumably the idea of Watkins and Palkin, *2*, the presence in the drug of bases other than alkaloids, *3*, the decomposition of the alkaloids during the assay process, or *4*, the formation of some alkaloidal hydrochloride in the evaporation with chloroform which would indicate a low yield of alkaloid Therefore, any successful study of this problem should cover these four points

The following determinations upon the pure alkaloids had been completed previous to H G DeKay's special assignment to the problem

I TO DETERMINE THE STABILITY OF ATROPINE AND HYOSCYAMINE

Experiments under A and B were performed by H G DeKay, A C Smith and C N Sprankle, graduate students at Purdue University

A TO DETERMINE THE EFFECT OF HEAT ON THE ALKALOIDS

Experiment 1 Four samples of pure alkaloid were dried at 80° C for 1 hour without loss

Experiment 2 The pure alkaloids were dissolved in 2% sulphuric acid, the solution was made basic with ammonia T S and extracted with chloroform The chloroform was evaporated to about 2 cc on a water bath and treated as follows, before completing the assay

	Atropine			Hyoscyamine		
	Assays	Used Gm	Recovered Gm	Assays	Used Gm	Recovered Gm
A Standard acid was added and the assay completed	8	0 0398	0 0472	2	0 0349	0 0354
B Dried in a current of air at 40° C	3	0 0486	0 0472	3	0 0328	0 0328
C Repeat B and dry the residue 48 hours in a desiccator	2	0 1070	0 1027	2	0 0455	0 0443
D Evaporate to dryness and heat 5 minutes	5	0 0361	0 0371	5	0 0351	0 0340
E Repeat D except heat 30 minutes	5	0 0349	0 0349	3	0 0351	0 0300

Conclusion From the above experiments it is evident that the heating of chloroform solutions of the pure alkaloids at water-bath temperatures does not cause any decomposition

B TO DETERMINE THE EFFECT OF CHLOROFORM UPON THE ALKALOIDS

Experiment 1 The pure alkaloids were dissolved in chloroform and the solution evaporated to 2 cc and treated as follows, before completing the assay

	Atropine			Hyoscyamine		
	Assays	Used Gm	Recovered Gm	Assays	Used Gm	Recovered Gm
A Evaporated to dryness on a water-bath and heated (1) 1 hour	2	0 1609	0 1591	2	0 1040	0 1032
(2) *over night*	2	*0 1609*	*0 1591*	2	*0 1040*	*0 1032*
B The assay completed	5	0 0422	0 0435	5	0 0301	0 0297
C Evaporated to dryness on a water-bath, (1) heated 15 minutes				2	0 0385	0 0411
(2) heated 30 minutes				2	0 0408	0 0411
(3) heated 1 hour				2	0 0413	0 0410
D Evaporated to dryness in a current of air dried in a desiccator for 48 hours	3	0 0239	0 0242			

Experiment 2 The alkaloids were dissolved in chloroform and allowed to remain in the solvent (A) 12 hours and (B) 24 hours, respectively, before completing the assay

		Gm	Gm		Gm	Gm
(A)	3	0 0419	0 0421	3	0 0301	0 0304
(B)	3	0 0431	0 0431	3	0 0200	0 0202

Conclusion The above experiments indicate that no hydrochlorides of the alkaloids are formed when their chloroform solutions are evaporated to dryness at water-bath temperatures

C TO DETERMINE THE EFFECT OF ASSAY PROCESSES ON THE ALKALOIDS

Experiment 1 (A) The U S P X assay process for Hyoscyamus was followed, atropine instead of the crude drug being used (B) Experiment A was repeated except that the final chloroform extract was dried in a current of air at 40° C and the assay completed

(A) Results of 2 samples Used 0 0480 Gm Recovered 0 0502 Gm
(B) Results of 2 samples Used 0 0463 Gm Recovered 0 0451 Gm

Experiment 2 Pure atropine was extracted with ammonia water, alcohol and ether in a Soxhlet apparatus for 2 hours, (A) the assay was completed (B) The final chloroform extract was evaporated to dryness placed in a desiccator over night and the assay completed

(A) Results of 2 samples Used 0 0481 Gm Recovered 0 0488 Gm
(B) Results of 2 samples Used 0 0422 Gm Recovered 0 0423 Gm

Experiment 3 (A) An exhausted drug was fortified with equal parts of pure atropine and hyoscyamine, placed in a Soxhlet apparatus and assayed according to the process recommended by J J Durrett (B) The above experiment was repeated, the final chloroform solution was evaporated to dryness on a water bath taken up in chloroform and again dried This was repeated two more times before completing the assay

(A) Results of 2 samples Used 0 021 Gm Recovered 0 0236 Gm
(B) Results of 2 samples Used 0 021 Gm Recovered 0 0215 Gm

Experiment 4 A definite weight of a mixture of equal parts of pure alkaloids was added to the crude drug and then assayed by the above method

Results from 3 samples Added alkaloid 0 0207 Gm Recovered 0 0194 Gm

Experiment 5 Experiment 4 was repeated to the point where the final chloroform solution is evaporated to low volume This extract was evaporated to dryness on a water-bath redissolved in chloroform and again dried this was repeated two more times and the assay was completed

Results from 2 samples Added alkaloid 0 020 Gm Recovered 0 0173 Gm

Conclusion A careful study of the above experiments indicates

1 That the alkaloids of Hyoscyamus undergo no change during the regular assay process, *2*, that the alkaloids may be heated at water-bath temperatures without danger of decomposition, *3*, that no hydrochlorides of the alkaloids are formed when chloroform solutions of them are evaporated to dryness, and *4*, that the assay process recommended by J J Durrett extracts some volatile base

Schou and Bjerregaard (5), while working upon sterilization of solutions, found that solutions of atropine could be heated at 120° C over a period of 20 minutes without danger of decomposition

Five experiments were completed to determine whether ammonia contaminates the residues from the assay processes It is apparent that any ammonia which is carried over by the chloroform in the final extraction is eliminated in the evaporation process

Our results corroborate the work of Watkins and Palkin on the stability of these alkaloids and verifies their conclusion that the residues after shaking out and drying are not contaminated with ammonia

II EXPERIMENTS ON POWDERED HYOSCYAMUS

A 75-pound lot of Hyoscyamus in No 60 powder was obtained from Eli Lilly & Company for this work The drug was ground and mixed by the Company Ash determinations were made with the following results

Total Ash	Acid Insoluble Ash
23 25%	8 71%
23 29%	8 55%
23 20%	8 67%
23 17%	8 87%

Qualitative inorganic analysis upon the ash showed the presence of potassium, sodium, ammonia and iron as the sulphates, nitrates and chlorides There were traces of aluminum

Assay Experiments —Experiment 1 A sample of drug was subjected to the U S P X process of extraction, stronger ammonia water being used The extract was subjected to the purification process recommended by Watkins and Palkin as follows The extract was evaporated to low volume, 10 cc of 0 05*N* sulphuric acid and 5 cc of water added and the evaporation continued until the odor of ether had disappeared The acidified liquid was decanted into a 50-cc volumetric flask The residue remaining in the flask was dissolved with chloroform, 5 to 10 cc of acidulated water added and the chloroform removed by heating The contents of the original flask were poured into the volumetric flask, which was cooled and made up to volume The mixture was filtered, the first few cc 's rejected, an aliquot part collected, made basic with ammonia water, shaken out with chloroform and the assay completed with the following results

1	0 079%
2	0 073%

The titrated mixtures gave positive results for primary amines by the isonitrile reaction

Experiment 2 Samples were subjected to the U S P X assay process modified by macerating over night and by the use of stronger ammonia water with results as follows

1	0 0663%	7	0 073 %
2	0 079 %	8	0 0763%
3	0 057 %	9	0 066 %
4	0 082 %	10	0 0731%
5	0 0834%	11	0 0761%
6	0 0733%	12	0 0633%
		Average	0 073 %

The titrated mixtures gave positive results by the isonitrile test

Experiment 3 Samples of the drug were subjected to the U S P X assay process with the Watkins and Palkin purification process being used in place of shaking out with dilute sulphuric acid

1	0 110%	7	0 087 %	13	0 122%
2	0 093%	8	0 107 %	14	0 114%
3	0 092%	9	0 083 %	15	0 107%
4	0 104%	10	0 109 %	16	0 113%
5	0 101%	11	0 088 %	17	0 112%
6	0 094%	12	0 1225%	Average	0 103%

Positive results were obtained by the isonitrile test

Experiment 4 Samples of the drug were subjected to Soxhlet extraction after one hour maceration with U S P solvents and then the assay completed by the W & P process

1	0 1025%
2	0 1001%

Positive results were obtained by the isonitrile test

Experiment 5 The above experiment was repeated except that the residues were dried, before the assay was completed as follows (A) On the water-bath, (B) in an oven at 80° for 1 hour

(A)				(B)	
1	0 0627%	4	0 0428%	1	0 0319%
2	0 0564%	5	0 0440%	2	0 0424%
3	0 0553%	Average	0 0522%	Average	0 0371%

The above gave faint isonitrile tests

Experiment 6 Lots of drug were macerated over night with stronger ammonia water and the U S P solvent, and percolated according to the U S P X process Then the percolate was subjected to the W & P purification process Later the marc from each sample was extracted in a Soxhlet, alcohol being used as a solvent Additional basic material was secured

	Assay	Basic Constituent Extracted by Alcohol	Total
1	0 122%	0 0178%	0 140%
2	0 114%	0 021 %	0 135%
3	0 113%	0 019 %	0 132%

The titrated mixtures gave positive isonitrile tests

Experiment 7 Three samples were assayed by the W & P process, their special apparatus being used

1	0 100 %
2	0 102 %
3	0 1047%

Experiment 8 Samples of drug were assayed by the W & P process, the solvents recommended by them being used, were then macerated over night and were extracted in a Soxhlet apparatus

1	0 136%	7	0 125 %	13	0 146%
2	0 132%	8	0 109 %	14	0 127%
3	0 155%	9	0 1167%	15	0 135%
4	0 127%	10	0 1205%	16	0 127%
5	0 120%	11	0 1025%	17	0 125%
6	0 125%	12	0 135 %	Average	0 127%

All of these titrated residues gave positive results by the isonitrile test

Experiment 9 Samples of drug were macerated over night with ether-alcohol solvent and stronger ammonia water, then percolated according to the U S P X using ether and the percolate subjected to the W & P purification process

1	0 1425%	4	0 1136%
2	0 1437%	5	0 132 %
3	0 1287%	Average	0 132 %

Positive results were obtained by the isonitrile test

Experiment 10 Four samples of the drug were macerated over night with stronger ammonia water and extracted with the W & P solvent in a Soxhlet apparatus The extract was purified and made up to 100 cc 50 cc portions of each lot were assayed

1	0 1352%	3	0 1274%
2	0 1465%	4	0 135 %

Positive results were obtained by the isonitrile test

The residues of the other 50-cc portions were treated as follows

(A) They were dried at 40° C in a current of dry air before the addition of the standard acid,

(B) They were dried at 60° C in a current of dry air before the addition of the standard acid

	(A)		(B)
1	0 0901%	3	0 0665%
2	0 0836%	4	0 0557%

Experiment 11 Four samples of drug were macerated over night with stronger ammonia water and extracted with the W & P solvents in a Soxhlet apparatus The extractive was purified made basic with ammonia water extracted with chloroform and evaporated to dryness on a

water bath and the residue taken up with chloroform and again evaporated to dryness This process was again repeated, then taken up in chloroform, standard acid added and the assay completed

1	0 0869%	3	0 107 %
2	0 0871%	4	0 0985%
		Average	0 095 %

Positive results were obtained by the isonitrile test

Experiment 12 Samples of the drug were assayed according to the above experiment, and the final chloroform extract was dried in an oven at 80° C for 15 minutes

1	0 0676%
2	0 0893%
3	0 072 %

Positive isonitrile tests were obtained

Experiment 13 Three lots of drug were macerated for 1 hour with stronger ammonia water and ether, and then extracted in a Soxhlet apparatus ether being used as a solvent

The marc from these assays was extracted with alcohol after the addition of small amounts of stronger ammonia water An additional amount of basic material was obtained

	First Extraction	Marc Extract with Alcohol	Total
1	0 0894%	0 0382%	0 1276%
2	0 096 %	0 047 %	0 143 %
3	0 094 %	0 039 %	0 133 %

Positive isonitrile tests were obtained

Experiment 14 Eight samples of drug were macerated over night with ether and stronger ammonia water and extracted in a Soxhlet ether being used as a solvent

1	0 077 %	5	0 089 %
2	0 0788%	6	0 089 %
3	0 067 %	7	0 096 %
4	0 072 %	8	0 0773%
		Average	0 0812%

Positive isonitrile tests were obtained

Aliquot portions of the last five samples obtained after the purification process were evaporated to dryness on a water bath and dried 1 hour The residues were taken up in chloroform, standard acid added, and the chloroform then removed by evaporation before the assay was completed

4	0 0413%	7	0 039 %
5	0 044 %	8	0 036 %
6	0 039 %	Average	0 0398%

These titrated residues gave no isonitrile test

(*To be continued*)

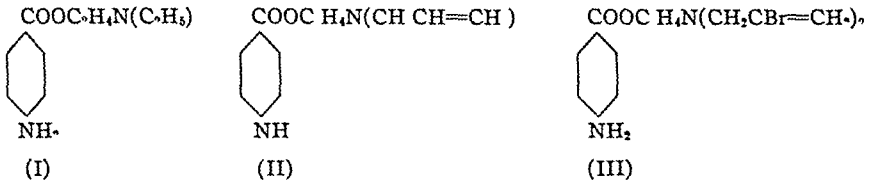
DI-β-BROMALLYLAMINO ETHYL *p*-AMINO BENZOATE *

BY W BRAKER AND W G CHRISTIANSEN

During the course of an investigation of a variety of local anesthetics, we have prepared di-β-bromallylamino ethyl *p*-amino benzoate This substance is analogous to procaine, the diethylamino group in the latter has been replaced

* Scientific Section A PH A Madison meeting, 1933

with a dibromallyl amino group The corresponding diallylamino compound is known (1) The structural relationship between procaine (I), di-β-allylamino ethyl *p*-amino benzoate (II) and di-β-bromallylamino ethyl *p*-amino benzoate (III) is indicated below



The compound (III) was obtained by condensing di-β-bromallylamino ethanol with *p*-amino benzoyl chloride The substance was isolated as its dihydrochloride A stable 2% aqueous solution of di-β-bromallylamino ethyl *p*-amino benzoate dihydrochloride could be made, but an electrometric titration indicated the p_H of this solution to be 1 9 An effort to buffer with disodium hydrogen phosphate was unsuccessful because of the fact that the addition of a minute quantity of the buffer resulted in the precipitation of the compound

A borate of the base (III) was also prepared but the compound was hydrolyzed in aqueous solution thereby precluding biological testing

EXPERIMENTAL

Preparation of di-β-Bromallylamino Ethanol—Fifty Gm of 2,3-dibrom propene and 8 Gm of mono-ethanol amine were dissolved in 100 cc of 95% alcohol, 80 Gm of silver oxide were added in small quantities with stirring, the mixture was stirred for two hours after the addition of all the silver oxide The mixture was then filtered and the filtrate fractionated Twenty-five Gm of a light yellow oil were obtained boiling at 141–145° C at 9–10 mm Yield—66%

Assay	Nitrogen	Bromine.
Found	4 58%	53 24%
Calc for $C_8H_{13}Br_2NO$	4 68%	53 51%

Preparation of p-Amino Benzoyl Chloride—This was obtained by the method of McMaster (2)

Preparation of di-β-Bromallylamino Ethyl p-Amino Benzoate—2 65 Gm of *p*-amino benzoyl chloride were dissolved in 20 cc of dry benzene To this solution, one consisting of 5 1 Gm of di-β-bromallylamino ethanol in 60 cc of benzene was added The solution was refluxed for 3 hours A yellow solid which separated during refluxing was filtered off, washed with ether and dried *in vacuo* An assay indicated that it was not the compound intended and it was not further investigated

The benzene filtrate from the reaction was treated with dry hydrochloric acid gas A light yellow, very viscous oil separated The benzene layer was decanted and the oil was dried *in vacuo* over calcium chloride and sodium hydroxide

The substance was identified by assay to be the dihydrochloride of di-β-bromallylamino ethyl *p* amino benzoate

Assay	Nitrogen	Chlorine
Found	5 61%	15 05%
Calc for $C_{16}H_{20}O_2N_2Cl_2Br_2$	5 70%	14 46%

SUMMARY

(1) Di-β-bromallylamino ethyl *p*-amino benzoate was prepared

(2) Aqueous solutions of the dihydrochloride are too acid for anesthetic tests The solutions are incapable of buffering without precipitating the base from solution

BIBLIOGRAPHY

(1) U S Patent 1,388,573

(2) *J A C S*, 50 (1928), 145

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES,
E R SQUIBB AND SONS, BROOKLYN, N Y

PHYSICS IN PHARMACY

BY JOHN URI LLOYD, WOLFGANG OSTWALD AND HANS ERBRING

(*Continued from page 221, March issue*)

In *Fig 13*, for example, quantities of absorbed, saturated solutions of KCl, $BaCl_2$ and $FeCl_3$, under identical experimental conditions, are recorded With increase in valence, there is increase of absorption Furthermore, $FeCl_3$ in dilute solution is strongly hydrolyzed The retained liquid volume must vary, not only with the concentration of the solutions, but also with the electrocapillary effects of the different ions,[1] and finally, with the influence of the dissolved substance on the state of swelling of the cellulose fibres

10 Influence of Concentration and Temperature

TABLE IX —INFLUENCE OF CONCENTRATION

System $FeCl_3$, concentrations *as below*, *vs* Water $d = 1\,5$ mm Paper dry at start.

Duration Hours	$FeCl_3$—Increase Mm	H_2O—Decrease Mm	Total Difference Mm
45% $FeCl_3$ Solution			
2	0 5	1 0	1 5
5	1 0	2 5	3 5
20	2 0	4 0	6 0
40	2 6	5 0	7 6
72	3 0	6 5	9 5
23% $FeCl_3$ Solution			
2		0 9	0 9
4	0 5	2 0	2 5
20	1 2	3 0	4 2
40	2 0	4 0	6 0
70	2 2	4 0	6 2

[1] We mention here the phenomena of the so-called "abnormal osmosis," cf a résumé by K Sollner, *Zschr f Elektrochemie*, 36 (1930) 234

12% $FeCl_3$ Solution			
10	0 2	1 5	1 7
20	0 5	2 2	2 7
40	0 6	2 5	3 1
60	0 7	3 0	3 7
70	1 0	3 2	4 2

TABLE X.—INFLUENCE OF CONCENTRATION

System Urea Solutions *vs* Water, d = 12 cm Paper dry at start

Duration Hours	Urea—Increase Mm	H_2O—Decrease Mm	Total Difference, Mm
50% Urea Solution			
10	1 4	2 0	3 4
20	2 2	3 5	5 7
40	3 2	4 5	7 7
80	3 0	5 0	8 0
4 wks	1 0	3 0	4 0
25% Urea Solution			
10	0 5	0 5	1 0
20	1 0	2 0	3 0
40	1 5	2 5	4 0
80	1 5	3 5	5 0
12 5% Urea Solution			
10	0 2	0 5	0 7
20	0 5	1 5	2 0
40	0 5	2 5	3 0
80	0 5	3 5	4 0

The influence of *Concentration* is shown in *Tables IX and X*, and in *Figs 14* and *15* for Ferric Chloride and Urea In the figures, the individual curves denote for the several concentrations, increases of level in cylinder S after each period of time, *e g*, 10, 20, 40 and 70 hours These curves are, as it were, cross sections taken at each period of time, through the speed curves of the increase of level

Only the sections through the ascending branch of the curves up to the maximum are here of interest

With $FeCl_3$ (see *Fig 14*), a group of curves is obtained, the lowermost of which, corresponding to the shortest period of time, differs very little from a straight line, while the curves obtained by sections at later periods of time have a faintly S-shaped course It should be remembered in this connection, that $FeCl_3$, on account of its hydrolysis in solutions, represents a relatively complicated system

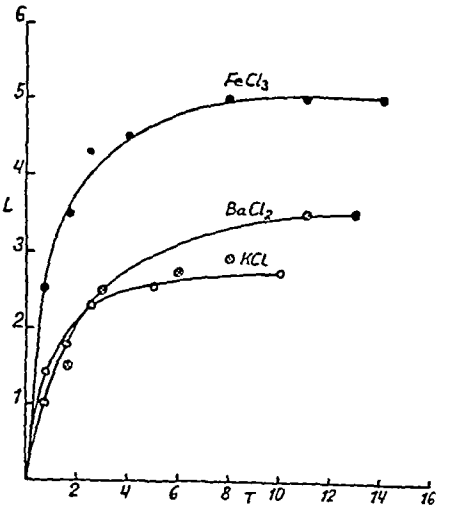


FIG 13.—L, Quantity of liquid held back by paper, in mm, T, Time in days

Urea, on the contrary, shows much simpler curves, the two lowermost of which

differ but little from a straight line All deviations, however, are in the sense of curvature *convex* to the axis of concentration Still, this mode of deviation and curvature is characteristic for most of the concentration functions of the directly measured osmotic pressure of concentrated solutions, whether molecular-disperse or colloidal [1]

Influence of Temperature —To study the influence of temperature, experiments were carried out under identical conditions, except that the temperature in one case was 20° C (room temperature), in the other 50° C (Air-thermostat)

TABLE XI

System $FeCl_3$ (saturated), *vs* Water $d = 7$ cm Paper dry at start

Duration	Increase of Level at 20°	Increase of Level at 50°
4 hrs	0 8 mm	0 9 mm
30 hrs	1 4 mm	1 6 mm
50 hrs	2 1 mm	2 5 mm

Table XI shows a slightly higher increase of level at 50° than at 20°

11 Isothermal Distillation —We mentioned before, that part of the liquid evaporates and condenses along the walls of the tubes This suggested the possibility that water, having a higher vapor pressure, may be transferred into cylinder S through isothermal distillation No doubt such a process takes place, but we can show that isothermal distillation, alone, is not sufficient to produce the Effect here described

In order to test out this possibility, experiments were conducted with identical arrangement of apparatus, except that *filter paper was not used* If in the course of time differences of level develop under these conditions, they can be explained only through differences of vapor pressure Our experiments (see *Table XII*) have shown that after about 3 days, a small difference of level in the expected direction, indeed, appears This difference, however, is incomparably smaller than the experiments with filter paper have shown, in which, in a shorter time, a value 20 times as much has often been obtained

TABLE XII

System $FeCl_3$ (saturated), *vs* Water

Duration	$FeCl_3$ Increase	H_2O Decrease	Total Difference	Length of d
2 hrs				4 cm
20 hrs				
72 hrs	0 3 mm	1 0 mm	1 3 mm	
5 days	0 5 mm	1 5 mm	2 0 mm	
20 hrs	0 2 mm	0 2 mm	0 4 mm	1 5
48 hrs	0 7 mm	0 7 mm	1 4 mm	
60 hrs	0 7 mm	0 7 mm	1 4 mm	
5 days	1 0 mm	1 0 mm	2 0 mm	

These results show that the differences in vapor pressure produce our Effect on a very small scale, hence the velocity of isothermal distillation is far too small to account for the relative magnitude of our Effect

[1] Cf Wo Ostwald, *Kolloid Z*, 49 (1929), 62 80, 56 (1931) 263, *Z physiol Chem A*, 159 (1932) 375

Surface Tension —Motions in capillary systems have been linked with differences in surface tension since Dutrochet, and more recently, since I Traube and others The capillary rise in filter paper is of course a result of surface tension, and will vary in height or speed, according to the magnitude of the tensions of the two liquids As soon as the 2 liquids have met in the filter paper, however, there can no longer be any difference of surface tension between them There may remain differences in *wetting power*, which would lead to the displacement of the pure solvent by the better wetting solution Thus a movement of liquids might arise which, however, would stop at once when the capillaries of the filter paper are saturated with the better wetting, dissolved substance

In order to examine the extreme case of such a wetting current, a very dilute (0 05%) soap solution was placed against pure water In this case, the difference of the two surface tensions is extremely great, at any rate considerably greater than, *e g*, in the case of $FeCl_3$ *vs* water Also, the wetting power of soap solution is naturally greater than that of pure water The effect produced is shown in *Table XIII*

TABLE XIII

System Sodium Palmitate (0 05%) *vs* Water

Duration	Soap Solution Decrease	Water Increase
24 hrs	1 0 mm	
46 hrs	1 0 mm	
70 hrs	1 5 mm	1 0 mm
8 days	1 5 mm	1 0 mm
10 days	1 5 mm	1 2 mm
15 days	1 5 mm	1 2 mm

A transfer of soap solution to water is distinctly noted, but again the Effect is of considerably smaller magnitude than in the case of $FeCl_3$ *vs* H_2O, notwithstanding the fact that the difference in surface tensions and wetting powers is much greater in the former than in the latter Besides, the movement ceases after about 3 days, which agrees with theoretical prediction

Thus the source of energy causing the Effect described, cannot reside in differences of surface tension and of wetting power

III THEORY OF THE EFFECT

Before giving the theoretical explanation of the Effect, we will summarize once more the principal phenomena graphically, as it is done in *Fig 16* The Effect, as to time, takes place in three parts (I, II, III) To these, strictly speaking, should be added a "prelude," consisting in the preliminary capillary rise of both liquids

In *Fig 16*, *A* shows the rise in the salt tube, or the difference of level of both liquids during the experiment *D* shows the location, resp , the migration of the diffusion zone between salt solution and water during the process This migration within the filter paper is represented somewhat more plainly in *C* Finally, *D* shows the change of the average difference of densities of the liquids to the right and the left of the filter paper during the process This difference of density is only estimated from the intensity of coloration, *e g*, in the experiments with $FeCl_3$, hence the curve cannot be considered of quantitative value, although it correctly represents differences of actual observation

With the aid of this synoptical *Fig 16*, we present the following

THEORY OF THE EFFECT

Preliminary Process Water as well as salt solution, rises in the siphon as a result of surface tension [1] The liquids meet in the filter paper

In our experiments, the salt solution was given an advantage in order to enable the two liquids to meet at about the middle of the strip (cf *Fig 16, C–I*) This is

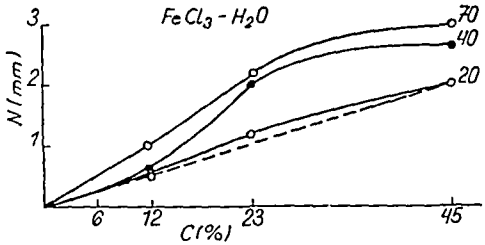


Fig 14 —C, Concentration in %, N, Increase of level in mm , Concentration curves after 20, 40 and 70 hrs

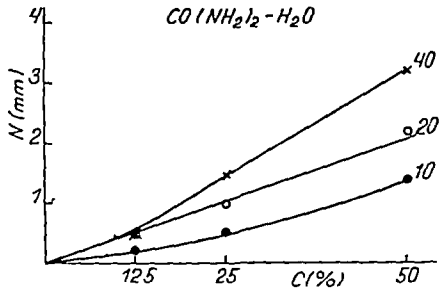


Fig 15 —C, Concentration in %, N, Increase of level in mm , Concentration curves after 10 20 and 40 hrs

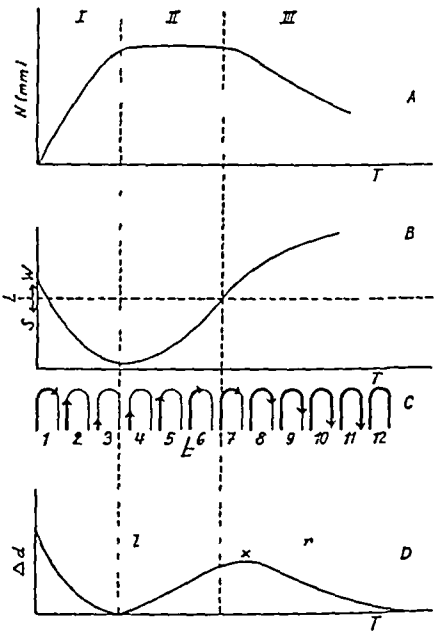


Fig 16 —Scheme A N, Rise in the salt tube, or difference of level of both liquids, T, Time Scheme B L, Position of zone limit of diffusion, W, Water tube, S, Salt tube, T, Time Scheme C L, Position of zone limits of diffusion Scheme D Δd, Average difference of densities of liquids to left and right in filter paper, l, Left tube heavier, r, Right tube heavier, T, Time

the starting condition, at which, in our experience, the Effect manifests itself most strongly

I The *First Divisional Effect* consists in a steep rise of liquid in the salt tube, *i e*, a sharp increase in the difference of level, with which is connected a sinking of the interface salt-solution-water in the salt tube (easily recognized with colored salts), and finally a corresponding decrease of the differences of weights of the liquid cylinders in both siphon tubes (cf *Fig 16, I–D*)

[1] The remarkable phenomena of capillary rise of solutions in filter paper have been pointed out by the senior author, more than 50 years ago PROC A PH A , 1879–1885 reprinted in *Kolloidchem Beihefte*, 8 (1916), 174

At least three sources of energy may be named as bringing about this movement of liquids First, the process is evidently that of a hydrostatic siphon effect When we connect two liquids of different densities by means of a siphon, as depicted in *Fig 17*, hydrostatic equilibrium will exist only when the products of height times density are equal in both arms of the siphon In the arrangement shown in *Fig 17a* (adopted in our experiment), the weights of the liquid columns in both branches are evidently not equal at the start Therefore, liquid will move in the direction of the arrow, from water to salt solution, which continues until the two liquid columns, now of different lengths, have again attained equal weights (cf *Fig 17b*) In contrast with an ordinary siphon with large cross section (*e g*, a glass tube), the hydrostatic equilibrium in our experiment does not take place instantaneously, but requires, for example, up to about 10 days' time This is not

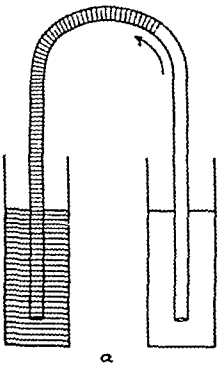


Fig 17*a*

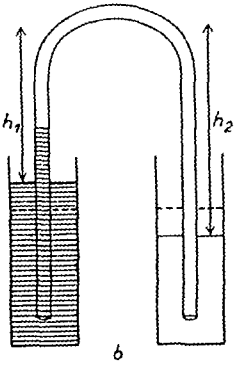


Fig 17*b*

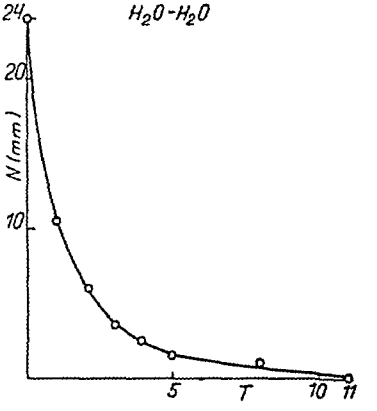


Fig 18—N, Difference of level in mm, T, Time in days

surprising when we consider the fact that, according to Hagen-Poiseuille's law, the velocity of flow decreases exceedingly fast with the diameter of the capillary tubes, for circular pipes in the ratio of r^4, *i e*, the fourth power of the radius Besides, we have in filter paper very irregular capillary spaces, which compel the current to follow detours

The slowness of a purely hydrostatic equalization in filter paper is well illustrated by the experiment of *Fig 18* Hydrostatic equalization was observed in a system containing water on both sides, but in which a difference of level of 24 mm was given to it at the start About 11 days were required for the termination of this purely hydrostatic equalization

Thus, one explanation of the 1st divisional effect which readily suggests itself, would consider the rise as a simple hydrostatic *Capillary Siphon Effect*

However, this explanation does not exhaustively describe the dynamics of the process Another source of energy exists, for it is evident that within a period of 11 days of experimentation, with the system employed, *Diffusion* must also become effective In the capillary siphon we have a continuous passage between salt solution and water, which presents the preliminary conditions for diffusion to manifest itself The diffusion of the salt molecules takes place in opposite direction to that

of the water current, which from hydrostatic causes, flows from the water tube to the salt tube Although this current overcomes the motion of diffusion, as is evi denced by the retrogression of the joint diffusion surface, diffusion will nevertheless not be completely inactive It will rather act always in the direction of in creasing the weight in the salt tube, *i e*, constantly supporting the hydrostatic effect Hence, the mechanism of liquid movements during the first divisional effect, is a combination of a purely hydrostatic effect (represented by the initial condition), and a simultaneous secondary hydrostatic effect produced by diffusion Thus the strip of paper acts at first as a "capillary siphon," as well as a *Diffusion Siphon*

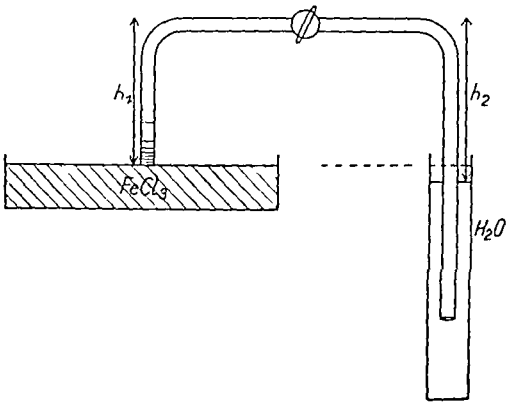


Fig 19

The mode of action of such a "Diffusion Siphon," can very well be demonstrated by the following arrangement of apparatus, to which E Manegold—Gottingen kindly called our attention [1] *Fig 19* A bent capillary tube dips at the left end directly beneath the surface of a salt solution contained in a wide dish, at the right into water contained in a narrow cylindrical glass vessel The siphon, fitted with a glass stop-cock in its center, is first filled with water On opening the stop-cock, diffusion of the salt begins, evidenced by the drawing up of water, as shown by the following figures, for which we are also under obligation to E Manegold

Time	3 days	5 d	7 d	9 d	10 d
Differences of level	2 1 mm	3 5 mm	4 9 mm	5 59 mm	6 7 mm

However, the effect of diffusion very probably is not only hydrostatic, this brings us to the consideration of a *third* source of energy for the first divisional effect

It is generally accepted that a dissolved substance, also a diffusing substance, develops an *osmotic pressure* This osmotic pressure becomes hydrostatically active and measurable, only when the solution meets a mechanical obstacle which hinders the mobility of the dissolved molecules, but not the mobility of the solvent It is merely another expression of the same fact when we substitute for the term "osmotic pressure," the osmotic attraction of the solvent by the dissolved particles Ordi narily, the scheme of a semipermeable membrane is selected in demonstrating this tendency of the solvent being attracted by the dissolved molecules, this effect is explained in molecular kinetics by a bombardment of the membrane by the dissolved molecules It seems, however, that the scheme of a semipermeable membrane is not the only possible method of converting the osmotic pressure into a hydrostatic one, demonstrating the osmotic attraction of liquids According to the customary

[1] We sincerely thank Dr Manegold for this friendly suggestion, as well as for others kindly made

notion, the dissolved molecules bounce perpendicularly upon the membrane When the membranes are thick and curved cylindrically, a *slanting*, or even *tangential* impingement of the molecules upon the cylindrical walls of the pores is possible, and has already been the subject of discussion Also, the well-known experiments of Bartell and Bigelow,[1] E Cohen[2] and others, have shown that osmotic effects may be observed, also, in clay cylinders, whose pore-diameters are notably greater than the diameter of the dissolved molecules (osmotic pressure with permeable membranes) [3]

In pursuing these reflections, we may conclude that in the case of diffusion in a capillary system of the nature of filter paper, the conditions are realized for the manifestation of osmotic effects, *i e*, an attraction of the solvent by the salt molecules, here also hindered in their mobility In such a system, the salt molecules will strike with exceedingly great frequency against the side walls, will thereby suffer a retardation of motion, and thus attract solvent in the same manner as they do in an ordinary osmotic cell Then we should be dealing here with "Osmosis without membrane," or "Capillary Osmosis" Even in the case when the origin of osmotic pressure is not referred to molecular kinetics, but if, *e g*, as H Hulshof[4] has done, a "tangential pressure" and an activity of the capillary layer are introduced, based on thermodynamic points of view, a capillary system of the character of filter paper may also be placed in parallel with the usual membrane

This third explanation of the "first divisional effect" would then be formulated as follows The impinging of the salt molecules upon the capillary walls of the strip of filter paper causes retardation of the free movement, and consequently of the diffusion of the salt molecules, but not of the movement of the water molecules, which are present in excess Therefore, an osmotic pressure arises in the direction toward the salt molecules, thus an attraction of the solvent This osmotic attraction of the solvent would act in the same sense as the two first-named sources of energy, at least as long as there is salt in the lower part of the salt tube If the salt diffuses further upward, the scene of its osmotic activity would also move upward We shall shortly discuss this effect more in detail

To sum up There are three sources of energy for the "first divisional effect" (1), A primary hydrostatic pressure, existing at the start of the system, (2), A secondary hydrostatic pressure, caused by diffusion and corresponding increase of weight in the salt tube, (3), Capillary-osmotic pressure, likewise caused by the diffusing salt molecules

(End of Second Instalment)

---

[1] F E Bartell, *J Phys Chem*, 16 (1912), 318, Lawrence Bigelow and F E Bartell, *J Am Chem Soc*, 37 (1909), 1194

[2] E Cohen *Z physik Chem*, 64 (1908), 1

[3] Cf also the detailed discussions by E Manegold and Solf, *Kolloid-Z*, 59 (1932), 179, further literature there given

[4] H Hulshof, *Z physik Chem*, 128 (1927), 110, *Proc Acad Amsterdam*, 33 (1930), No 2

Dedication of the American Institute of Pharmacy at Headquarters Building, Wednesday, May 9th, at 10 00 A M

AN EXAMINATION OF CEANOTHUS VELUTINUS *

BY L W RICHARDS AND E V LYNN

This member of the buckthorn family is an evergreen shrub found from British Columbia to California and from the Rocky Mountains to the Pacific Coast It is commonly known as sticky laurel or as mountain balm, but also by other names It grows best in sandy or rocky soil in the hills and is found profusely on logged-off land, of which the acreage on the coast is large and constantly increasing Wahlenberg (5) has recommended it as an aid in reforestation

The leaves are covered with a sticky substance of cinnamon-like odor, which the flowers also possess in a magnified degree Because of this waxy matter the plant is considered a serious fire-menace in the Californian forests

The plant has previously been examined three times, but not exhaustively In 1916, Scalione and Blakemore (2) made an investigation, particularly of the wax, 7 3 per cent, and of the tannin, 17 3 per cent In 1922, Howard (3) classified the leaf-wax as a balsam because it yielded a volatile oil and cinnamic acid A year later Lynn, Lee and Clausen (4) distilled an oil from the leaves and suggested that it is largely aldehyde

The eastern species, *Ceanothus americanus*, has been examined extensively and repeatedly since the middle of the last century An alkaloidal mixture, ceanothyn, is well known in certain medical circles, it is obtained from the roots and root-bark

The material used in this work was gathered mostly near Seattle, but also partly near Missoula, Montana It was freed from foreign matter, cleaned well and dried in the air Some of the roots and leaves were powdered before use

Histological —In order to throw some light on the origin of the sticky coating, which is found in great abundance on the leaves, permanent and temporary sections of the latter were made These revealed at frequent points pear-shaped structures descending from the upper epidermal cells, the point near the surface consisting of two parallel rows of large, pentagonal cells The two rows separated half way down and formed the circular end Within this cavity was found a network of smaller, thick-walled cells which undoubtedly is conductive tissue and forms a canal through the leaf Of course, the stomates are on the under side of the leaf, *not on the upper surface* While *the interior portion* of this peculiar structure was easily stained by various reagents, the large outer cells were unaffected by any of them Although the content would suggest a secretory layer, there is no reason to relate the structure to secretion Dr Eames, of Cornell, expressed the opinion that the cylinders are bundle-sheaths and probably not linked with the balsam, and in this Dr Rigg of Seattle concurs It is interesting to note, however, that the structure is not possessed by any of six other species of *Ceanothus*, which also do not have the balsamic coating These are *prostratus*, *americanus*, *ovatus*, *pubescens*, *fendleri* and *thyrsiflorus* The structure was found to be missing in the leaf-bud and in very immature leaves It evidently appears at the time when the tissues are first differentiated according to function

Proximate Analysis —This was made in the usual way on the leaves and on the root-bark

* Scientific Section, A PH A , Toronto meeting, 1932

	Leaves	Root Bark
Loss in air	50 6	48 3
Ash	4 5	6 5
Petroleum-ether extract	12 8	0 5
Ether extract	12 8	2 2
Crude fibre	12 3	17 6
Total nitrogen × 6 25	10 6	

Selective Extraction—The bark, wood and flowers were each submitted to selective extraction by the solvents given The results follow

	Bark	Wood	Flowers
Petroleum ether	1 18	0 75	2 84
Ether	1 89	0 27	2 48
Alcohol	12 40	4 51	13 85
Acetone	0 42	0 59	3 47
Carbon disulphide	0 04	0 14	None
Ethyl acetate	0 07	0 04	None
Water	8 36	3 72	16 70

Volatile Oil—The flowers furnished 0 1 per cent of an oil which was apparently unlike that from other parts of the plant The total amount of flowers available was not sufficient to warrant any examination of the oil

From the leaves by distillation with steam, there was obtained 0 14 to 0 21 per cent of oil, the amount being largest during the winter months and gradually decreasing up to the time of flowering in May and June Judging by the index of refraction, however, the oil obtained at different times of the year was constant in composition It was reddish brown in color and possessed a strong, aromatic and pungent odor The constants were specific gravity at 20° C 0 9565, index of refraction at 20° C 1 509 to 1 542, specific rotation −12 5°, saponification number 148 4, 142 0 and 155 0, 22 per cent soluble in sodium hydroxide, 20 per cent soluble in sodium bisulphite solution

The whole oil was fractionated and refractionated several times at 5-mm pressure with final results as given in the table

Fraction Degree	Per Cent	Approximately at 760 Mm Degree	n at 20° C
65– 80	7 5	165	
80– 90	8 0	190	1 5360
90– 94	14 0	211	1 5600
94– 98	7 5	214	1 5691
98–120	4 5	230	1 5031
120–125	4 0	239	1 4859
125–128	4 5	252	1 5015
128–135	3 0	259	1 5110
135–145	5 0	266	1 5150
145–157	9 5	273	1 5180
157–165	7 0	280	1 5200
Residue	25 5		

The chief constituents were found to be ethyl and cinnamyl cinnamates, the former in fractions 8–10 and the latter in these and the residue Saponification of the oil boiling at 132–135° gave cinnamic acid, melting at 132° C and

oxidizing with potassium permanganate to benzaldehyde The separated aqueous solution contained ethyl alcohol which was isolated and identified by conversion to the benzoate and acetate Cinnamyl cinnamate, melting point 43–44° C, was separated by treatment with warm alcohol and was further characterized by saponification to cinnamic acid and cinnamyl alcohol, whose phenyl urethane melted at 90° C

Salicylaldehyde, semicarbazone melting at 225° C, was apparently the chief component of fractions 2 and 3, which gave with ferric chloride a deep violet color

The fraction boiling at 126–128° probably contained esters of an alcohol with a strong odor like geraniol, although a diphenylurethane melting at 56° C and a phthalate melting at 204–205° C could not be referred to a known alcohol The acids from saponification were cinnamic acid and probably valeric acid, the latter partly identified by odor and boiling point

The lowest fraction contained terpenes which were not identified From Fraction 2 a bromide was separated with a melting point of 105° C (limonene?) and from Fraction 4 a bromide melting at 124° C (dipentene?) Fraction 10 also furnished a bromide melting at 92° C No further study was made of these The residue contained, with the cinnamyl cinnamate, a paraffin melting at 62° C

It is interesting to note that cinnamic aldehyde could not be identified in any of the fractions, notwithstanding that the odor is suggestive and that others have predicted its presence

Alkaloid —Preliminary experiments proved that the leaves do not yield alkaloids, but that some could be extracted from the bark and more from the root bark For further study a large quantity of the latter was collected, dried and ground to a coarse powder After considerable experimentation, it was found best to extract first with chloroform, from which the alkaloidal material was removed by means of very dilute sulphuric acid This solution gave with ammonia a copious, curdy, white precipitate which could again be collected by chloroform After repetition of the process several times, the precipitate was collected and dried, the yield being approximately 0 1 per cent

It was very soluble in chloroform and fairly so in hot alcohol or hot methyl alcohol, but was only slightly soluble in the cold alcohols, in ether, acetone, petroleum ether, benzene or carbon tetrachloride It was practically insoluble in water By means of hot methyl alcohol, there were obtained minute crystals in the form of raphides or needles, which were perfectly colorless This crystalline material decomposed when heated slowly and melted at indefinite points, when the temperature was raised quickly, the melting point was fairly constant at about 270° C with decomposition

Analysis by combustion gave figures which agreed closely with the simple formula, $C_{23}H_{26}N_2O_4$ Those for six consecutive determinations of carbon and hydrogen and three for nitrogen were as follows

	1	2	3	4	5	6
Carbon	69 7	70 0	69 9	69 8	70 2	70 0
Hydrogen	7 0	7 0	7 1	6 8	7 0	7 2
Nitrogen	7 2	7 3	7 3			

Calculated for $C_{23}H_{26}N_2O_4$ Carbon 70 0, hydrogen 6 5, nitrogen 7 1

To determine the molecular weight by the freezing-point method was impracticable

because of insolubility in the proper liquids The boiling-point method also proved unsatisfactory, because the small amount of material precluded using a suitable apparatus like those of McCoy or Cotrell The figure obtained in one experiment was 125, calculated 394

Precipitating agents, except tannic acid, gave very satisfactory reactions with acidified aqueous solutions

Reagent	Precipitate
Mayer	Very small white granules
Sonnenschein	Amorphous, light blue
Scheibler	Amorphous, white
Wagner	Amorphous, brown
Wormley	Amorphous, yellow
Picric acid	Granular crystals
Platinum chloride	Small light yellow, granular crystals
Cold chloride	Amorphous yellow
Hydrobromic acid	Amorphous, white
Hydriodic acid	Amorphous brown

A few color reactions were noted, although no attempt was made to study these completely Froehde s reagent gave a green color changing to brown and then back to green Marquis' reagent yielded a green turning slowly to a brown Mandelin's reagent produced a yellow color which later became brown No reactions were obtained in the Vitali test, with concentrated ammonia water or in the fading purple test as for strychnine Nitric acid gave a blue-green color which soon changed to purple and finally faded Sulphuric acid produced a yellowish brown and finally a purple Hydrochloric acid gave a beautiful blue which later became green

The hydrochloride was prepared, by passing dry hydrogen chloride into a chloroformic solution, as a white, agglutinated mass which was very unstable and gave no definite melting point It was completely decomposed at 240° C Analysis by the usual methods gave 5 4 and 5 8 per cent of chlorine, compared to 8 2 per cent is calculated for a monohydrochloride

The small amount of material available prevented any further study, but plans are now being laid to collect larger quantities of root-bark and to examine the alkaloid more carefully, chemically and pharmacologically

Coloring Matter —Extracts of leaves, bark and root-bark contained coloring agents which did not respond to the Borntrager test, in spite of the fact that many of the Rhamnaceæ contain anthraquinone derivatives Aqueous or alcoholic extracts of the root-bark were of a bright red color, from which ammonia precipitated a gelatinous, purple substance This was soluble in acid to give a red solution, but was not soluble in any of the organic liquids Qualitatively it gave several reactions which are characteristic of anthraquinone derivatives and we plan to study it further

Dermatitis —In 1905, Rooney (1) described somewhat a dermatitis which was attributed to *Ceanothus velutinus*, and a number of persons in Washington have orally reported similar experiences In view of the wide-spread occurrence of this plant, it is very possible that many cases of poisoning laid to species of *Rhus* are in reality caused by *Ceanothus* With the aid of Drs Wm Clausen and Henry Odland, both dermatologists, it was found that such a dermatitis could be caused

on a small percentage of subjects by either the leaves or an ethereal extract of them, but that aqueous solutions are inactive One of the writers was continually affected during collection of material

The eruption appeared on the skin one or two days after contact The first symptoms were itching and burning, with subsequent redness, and finally vesicles appeared on the surface On the face the skin became bright red and the eyelids and surrounding tissues were markedly swollen These symptoms continued for two or three weeks after exposure and then gradually subsided Simultaneously, desquamation occurred in the form of small scales and large flakes of dried epidermis Treatment by the antigens of poison oak or ivy was of no prophylactic or curative value, but the conditions were relieved by the usual moist compresses and soothing lotions

SUMMARY

The leaves of *Ceanothus velutinus* present microscopically a peculiar structure which is not found in other species and may be related to the characteristic balsamic coating They furnish 0 14 to 0 21 per cent of an oil which is chiefly ethyl and cinnamyl cinnamates, with smaller amounts of salicylaldehyde, terpenes and esters of an unidentified alcohol with cinnamic and probably valeric acids The root-bark furnishes about 0 1 per cent of alkaloid, part of which was obtained in the crystalline state Analysis indicated the formula $C_{13}H_{26}N_2O_4$ Some study was made of its properties and reactions Reports of a dermatitis from the leaves were confirmed and the symptoms are described

REFERENCES

(1) Rooney, *California State Journal of Medicine* (1905)
(2) Scalione and Blakemore, *Ind & Eng Chem*, 8 (1916), 411
(3) Howard, Jour A Ph A, 11 (1922), 19
(4) Lynn, Lee and Clausen *Ibid*, 12 (1923) 420
(5) Wahlenberg, *J Agr Research*, 41 (1930), 601

Seattle, Wash,
October 1, 1932

THE INTERNATIONAL STANDARD FOR THE ŒSTRUS PRODUCING HORMONE

At the request of the officers of the Permanent Commission on Biological Standards of the Health Organizations of the League of Nations the Board of Trustees of the U S Pharmacopœial Convention has agreed to assume the responsibility for distributing the International Standard for the Œstrus-Producing Hormone in the United States Supplies of this material have just been received from the National Institute for Medical Research London where the International Standard has been prepared This Standard is now available for the use of manufacturers of preparations of this Hormone, for the purpose of establishing for their products a uniform potency in the terms of the International Unit one International unit consists of 0 0001 mg of the Hormone issued by the League of Nations This material is also available for those carrying out important therapeutic researches in this field

A memorandum suggesting the course to be followed in using the International Standard has also been supplied by Dr H H Dale Director of the National Institute for Medical Research Those who are interested in securing this memorandum or the International Standard, should communicate directly with E Fullerton Cook, Chairman of the U S P Committee of Revision 43rd Street and Woodland Avenue Philadelphia

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

APPARATUS AND MANIPULATIONS

Anon
Apparatus for pharmaceutical manufacturing on a small scale
Schweiz Apoth Ztg , 72 (1934) 27 112 129

Anon
New suppository and bougie press
Farm Revy, 33 (1934) 165

Hirt, Georges
Modification of the Chamberland autoclave to permit of its use for the sterilization of surgical dressings
J pharm chim 19 (1934) 162

PHARMACOPŒIAS AND FORMULARIES

Casparis, P
Review of the new Swiss Pharmacopœia
Schweiz Apoth Ztg 72 (1934), 25 82 93, 105, 121, 137

Corfield, C E
Some notes on the revision of the British Pharmaceutical Codex
Pharm J , 132 (1934), 279

Harms H
Review of the new Swiss Pharmacopœia
Apoth -Ztg 49 (1934) 259

Schou Svend Aage
Galenical preparations of the Danish Pharmacopœia, 1933
Arch Pharm og Chem , 41 (1934) 146 177

PHARMACEUTICAL PREPARATIONS

Bateson, F R C , and Long C A
Paraffin and agar emulsions
Pharm J , 132 (1934), 228

Beukema Goudsmit M
Investigation of the formation of color in solutions of sodium salicylate and sodium bicarbonate
Pharm Weekbl 71 (1934), 196

Brandrup, Wolfgang
Saponin as an emulsifying agent in pharmacy
Pharm Zentralh 75 (1934) 129

Burgess, Geoffrey C
The preparation of mercury ointment
Pharm J 132 (1934), 252

Fantus, Bernard, Dyniewicz H A , and J M
A study of vehicles for medicines V Compound elixir of chloral and bromide
Jour A Ph A , 23 (1934), 232

Forster W
Ammoniated Solution of Quinine Loss of ammonia on storage
Pharm J 132 (1934), 281

Gfeller Hans
New suppository base, hydrogenated peanut oil
Pharm Acta Helv , 9 (1934), 13

Horrmann Paul and Greve, Wilhelm
Investigation of the course of the reaction in the preparation of Emplastrum fuscum camphoratum, D A B VI
Arch Pharm , 272 (1934), 505

Kuhn, A
Investigation of homeopathic iron preparations
Pharm Zentralh 75 (1934), 131

Lee C O , and Close, Marshall
A study of Aromatic Elixir
Jour A Ph A 23 (1934), 236

Madsen C J Toft
Sterilization of sodium ethylbarbiturate solutions
Dansk Tids Farm , 8 (1934), 62

Manson T H
Pill medication
Pharm J 132 (1934), 200

Rojahn C A , and Wieder, Hans
Size of colloidal particles in homeopathic preparations
Arch Pharm , 272 (1934) 198

Thomann, J
Preparation of sterile solutions for injection
Pharm Acta Helv , 9 (1934), 2

Woodman, R M
Studies in emulsions I Proteins and allied substances as emulsifiers for phenolic liquids
J Soc Chem Ind , 53 (1934), 57T

Wruble, Milton
Studies in percolation Detannated tincture of cinchona
JOUR A PH A , 23 (1934), 208

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Amrhein, Florin J
Absorption of Vitamin D from the skin
JOUR A PH A 23 (1934) 182
Brand, K
Contribution to the knowledge of the influence of alkyl- and alkylmercapto-groups on the therapeutic activity of organic compounds
Arch Pharm , 272 (1934) 257
Dille, James M
The effect of ethylene glycol on the serum calcium of the rabbit
JOUR A PH A , 23 (1934), 202
Fosdick, Leonard S , and Hansen Harold L
The toxicity and anesthetic efficiency of a new local anesthetic
J Pharmacol & Exper Therap , 50 (1934), 323
Hampshire, C H
Standard preparations used in biological assay
Pharm J , 132 (1934), 229
Horsley, C H
Investigation into the action of St John's wort
J Pharmacol & Exper Therap 50 (1934) 310
Kaufmann H P
Studies in the synthesis of new remedies VII Contribution to the theory of the action of laxatives
Arch Pharm 272 (1934), 481
Krueger, H M
The effects of morphine and its derivatives on intestinal movements I Morphine and the codeine isomers
J Pharmacol & Exper Therap , 50 (1934) 254
Kwit Nathaniel T , and Gold Harry
Further experimental observations on the combined effects of digitalis and quinidine on the heart
J Pharmacol & Exper Therap 50 (1934), 180
Lerman J , and Salter W T
The maintenance requirements of myxedema patients Clinical and chemical assay of commercial thyroid preparations
J Pharmacol & Exper Therap , 50 (1934), 298
Møller, Knud
Biological assay of medicinal preparations
Dansk Tids Farm , 8 (1934), 41
Moness, E , and Christiansen, W G
Study of germicidal and antiseptic activities of some derivatives of 8-hydroxy quinoline
JOUR A PH A , 23 (1934), 228
Rakieten, N , *et al*
The effect of some compounds of barbituric acid and of urethrane
J Pharmacol & Exper Therap , 50 (1934) 328
Riggs, Lloyd K , *et al*
Assay for vitamin B complex in the presence of interfering substances
JOUR A PH A , 23 (1934), 191
Sabalitschka, Th
Synthetic studies on the relationship between chemical constitution and antimicrobic action
Arch Pharm , 272 (1934), 383
Scheer, Max, and Kiel Harry
The skin eruptions of codeine
J A M A 102 (1934), 908
Smith, Francis M
Treatment of Diabetes Insipidus by intranasal insufflation of posterior lobe pituitary powder
J A M A , 102 (1934), 600
Tatum, A L , and Cooper, G A
An experimental study of mapharsen (meta-aminopara-hydroxyphenylarsine oxide) as an antisyphilitic agent
J Pharmacol & Exper Therap , 50 (1934) 198
White, John L , and Schlageter, Emil A
Comparative immunizing value of diphtheria toxoid with and without alum, as indicated by the Schick test
J A M A , 102 (1934), 915

BOTANY AND PHARMACOGNOSY

Casparis, P , and Naef, P
Resins of mastic and Manila elemi
Pharm Acta Helv 9 (1934) 19
Dieterle, H , *et al*
Constituents of the stem bark of Lophopetulum toxicum
Arch Pharm 272 (1934), 172
Jaretzky, R , and Axer, B
Contribution to the pharmacognosy of Sarothamnus scoparius, Koch and parallel drugs
Arch Pharm 272 (1934) 152
Keller, O
Investigation of Orthosiphon stamineus, Benth
Arch Pharm , 272 (1934), 242
Kondo, H and Ikawa, S
Investigation of the constituents of "Senso" III
J Pharm Soc Japan No 624 (1934), 22
Raymond Hamet
A new Rubiaceæ, Corynanthe paniculata Welwitsch
J pharm chim , 19 (1934), 209

Rosenthaler, L
Investigation of the constituents of laxative drugs
Pharm Acta Helv 9 (1934) 9
Sallet, Albert
Medicinal plants of Indo-China, Quisqualis indica L
Bull sci pharmacol, 41 (1934) 72
Valaer, Peter, and Mallory, G E
A study of aloes and a quantitative determination of some of its constituents
Am J Pharm, 106 (1934), 81

ALKALOIDS AND GLUCOSIDES

Amrhein, Florin J
Notes on the assay of strychnine alkaloid in strychnine sulphate tablets
Am J Pharm, 106 (1934) 57
Dietzel, R, and Kühl, G W
Disintegration of alkaloids in aqueous solution, particularly on sterilization
Arch Pharm, 272 (1934), 369
Drake, W V, and McElvain, S M
The reaction of organic halides with piperidine IV Bromo esters
J Am Chem Soc, 56 (1934), 697
Kofler, L, and Steidl, G
Occurrence and distribution of saponins in medicinal plants
Arch Pharm, 272 (1934) 300
Kussner, W
Ergoclavine, a new specific alkaloid of ergot
Arch Pharm, 272 (1934) 503
Leger, E
Determination of morphine in opium by the lime method
Bull sci pharmacol, 41 (1934) 65
Leger, E
Glucosides of Digitalis lanata A review
J pharm chim 19 (1934) 169
Leonard, C S and Arthur John M
The reputed influence of ultraviolet light on the yield of digitalis glucosides
Jour A Ph A, 23 (1934), 224
Lillig, R
Specific rotatory power of alkaloids and alkaloidal solutions
Pharm Ztg, 79 (1934), 198
Mannich, C
"Offenes" ecgonine and tropine
Arch Pharm, 272 (1934), 323
Peters Allen F and Osol Arthur
The colorimetric and electrometric p_H determinations of solutions of certain alkaloidal salts
Jour A Ph A, 23 (1934) 197
Schlemmer, F and Koch, H
Titration method for alkaloidal determination
Arch Pharm, 272 (1934), 394
Sipple, Horace L, King C G, and Beal, George D
A study of the constituents in Cascara Sagrada Extract I Isolation of a rhamno-glycoside of emodin
Jour A Ph A, 23 (1934), 205
Winterfeld K, and Rauch, C
Study of sparteine IV
Arch Pharm, 272 (1934), 273

OILS, FATS AND WAXES

Coe, Mayne R, and LeClerc J A
Photochemical-studies of rancidity Peroxide values of oils as affected by selective light
Ind Eng Chem, 26 (1934), 245
Dieterle H, and Salomon, A
Onocerin, the phytosterin in Ononis spinosa L
Arch Pharm, 272 (1934), 142
Graham J Howard
A contribution to the photochemistry of cod liver oil
Am J Pharm, 106 (1934), 44
Haines R T M and Drummond, J C
The grouping of halibut-liver oils
J Soc Chem Ind, 53 (1934), 81T
Horn, David Wilbur, and Wilson, Margaret Alberta
Transition points of mixtures of cow's butter and cacao butter
Am J Pharm, 106 (1934), 59
Kariyone T, and Hasegawa, Y
Constituents of sapucainha oil
J Pharm Soc Japan No 624 (1934) 28
Reber, K
Differentiation of "Oleum Hyperici" and olive oil colored with alkanet
Pharm Acta Helv 9 (1934), 1
Schuster, G
Contribution to the detection of adulteration of cacao butter
J pharm chim, 19 (1934) 206
Wikoff Helen L, Busey, Maribodine, and Kaplan, A M
Analytical constants of peanut butter
Ind Eng Chem, 26 (1934) 291

ESSENTIAL OILS

Bauer, K H and Starcke, H J
Resin of Manila elemi
Arch Pharm, 272 (1934), 167
Boehm, Theodor
Studies in the coumarin series, 3
Arch Pharm, 272 (1934) 406

British Essential Oil Sub committee
Uniformity of analytical methods The determination of aldehydes other than citronellal
Perf & Ess Oil Rec, 25 (1934) 36
Ekkert, Lad
Contribution to the chemical reactions of eucalyptol
Pharm Zentralh 75 (1934) 145
Freise Fred W
Brazilian plants explored for their coumarin
Perf & Ess Oil Rec 25 (1934), 39
Gaponenkov T K
Essential oil of Erigeron canadensis, L
J Appl Chem Russ 6 (1933) (1111–1114, 1115–1119) through *J Soc Chem Ind*, 53 (1934) 252B
Garnier R and Sabetay S
Analytical constants of Bulgarian rose oil
Compt rend 197 (1933) 1748–1750 through *J Soc Chem Ind* 53 (1934), 219B
Ruemele Th
Compilation of analytical data on essential oils
Pharm Zentralh 75 (1934) 173
Seivers A F and Lowman M S
Japanese mint in United States
Perf & Ess Oil Rec, 25 (1934) 78

ANALYTICAL METHODS AND RESULTS

Anon
Changes in methods of analysis Calcium gluconate
A O A C 17 (1934) 75
Anon
Tests for purity of mercurochrome
A O A C 17 (1934), 75
Anon
Changes in methods of analysis Papaverine and procaine
A O A C, 17 (1934), 76
Anon
Changes in methods of analysis Antipyrine, methenamine and triethanolamine
A O A C, 17 (1934) 77
Anon
Changes in methods of analysis Tetrachlorethylene
A O A C, 17 (1934), 78
Bari, Z
Evaluation of medicinal charcoals and preparations
Magyar Gyog Tars Ért 9 (1933), 52–68, *Chem Zentr*, 1 (1933), 1821, through *J Soc Chem Ind* 53 (1934) 171B
Budde, Hans
Gravimetric determination of derivatives of barbituric acids
Apoth -Ztg, 49 (1934), 295
Bumming, G and Kroll, S
Examination of calcium glycerophosphate
Arch Pharm 272 (1934), 297
DeClercq, A, and Van Hauwaert, Marg
Determination of the proteolytic activity of pepsin
J pharm Belg, 16 (1934), 211
Gros, Raoul
Determination of acetone
J pharm chim 19 (1934), 214
Hanson W E, Sweetser S B, and Feldman, H B
The potentiometric determination of arsenates
J Am Chem Soc, 56 (1934), 577
Houghton R E
Studies in the use of 2,4-dinitrophenylhydrazine as a quantitative reagent for carbonyl compounds, I Benzaldehyde
Am J Pharm, 106 (1934), 62
Junghans, Gunther
New method for the assay of extract of belladonna
Apoth -Ztg 49 (1934) 325
Lewis S Judd
Spectroscopy in pharmaceutical research
Chem & Drug, 120 (1934), 268
Müller, Aug
New constants for drugs
Apoth Ztg 49 (1934) 277
Patzsch Herbert
Methods for the quantitative determination of animal lipoids and their components
Pharm Zentralh, 75 (1934), 116
Wagenaar, M
Contribution to the microchemical identification of santonin
Pharm Weekbl, 71 (1934), 260

ORGANIC CHEMICALS

Busch M, and Pohlmann, Fritz
N-aminobarbituric acids
Arch Pharm, 272 (1934) 190
Grubb, William John and Read, John
The preparation of pure d-neomenthol from l-menthol
J Soc Chem Ind, 53 (1934), 52T
Henriksen Richard H
Derivatives of barbituric acid
Pharm J, 132 (1934), 200

Hoyt, L F
New table of the refractive index of pure glycerol at 20° C
Ind Eng Chem, 26 (1934), 329

Kindler, Karl, and Peschke, Wilhelm
New and improved methods for building up pharmacologically active amines IX Synthesis of papaverine and tetrahydro-papaverine
Arch Pharm, 272 (1934) 236

Rosenmund K W, and Schaprio, D
Synthetic investigations in the realm of anthelmintics
Arch Pharm 272 (1934), 313

COMPARISON OF KARAYA GUM AND TRAGACANTH *

L F GABEL

Karaya Gum (*Sterculia urens*) was formerly known as Indian Gum It comes chiefly from India The use of Karaya Gum in the preparation of toilet articles has increased in recent years This has been due to the discovery that Karaya possesses certain physical properties that make it superior to Tragacanth for some purposes

This laboratory has obtained data in regard to the comparative value of mucilages of Karaya and Tragacanth, and as the literature lacks information on this point, considered it worth while to publish the results

I KARAYA GUM DIFFERS FROM TRAGACANTH IN PHYSICAL AND CHEMICAL PROPERTIES AS SHOWN IN THE FOLLOWING TABLE

TABLE I

	Karaya	Tragacanth
Physical form	Lumps	Ribbons
Chief chemical principal	Gelose	Bassorin
Solubility in water	More soluble than Tragacanth	
Reaction	Acid (1 Gm requires 4 5 cc *N*/10 alkali to neutralize)	Acid (1 Gm requires 0 9 cc *N*/10 alkali to neutralize)
Appearance of solution in water	Translucent	Opalescent
50% Alcohol	Clear	Precipitates
Borax test (U S P)	Stringy and slimy	Not affected
Iodine T S	Colorless—free from starch	Blue color—starch present
Density	1 20	1 25

II MUCILAGE OF KARAYA GUM COMPARED WITH MUCILAGE OF TRAGACANTH

Mucilages of the gums were prepared according to the following formula

Powdered gum	42 grains
Glycerin (used as preservative)	5 oz av
Sufficient water to make	8 oz av

Tests were applied to the mucilages to note

1st Ability of the gum to form thick mucilage
2nd Effect of aging on the mucilage
3rd Differences in viscosity due to the method of manufacture, *i e*, 1st set of experiments prepared with heat 2nd set prepared by heating to boiling, 3rd set prepared by boiling two minutes 4th set prepared by boiling five minutes 5th set prepared by boiling ten minutes

* Section on Practical Pharmacy and Dispensing A PH A Madison meeting, 1933

In all experiments in which heat was used, the lot was allowed to cool and then sufficient water added to make 8 oz av of mucilage

The MacMichael Viscosimeter was used to note the variations in viscosity Readings were obtained with the following standards

Disc plunger
No 22 wire
Room temperature
8 r p m

The disc plunger is held or supported in contact with the mucilage by a standard No 22 wire The container holding the mucilage rotates at 8 revolutions per minute The resistance to the wire imparted by the viscosity of the mucilage is registered on a dial and the number of divisions indicated on the dial multiplied by 205 permits a mathematical comparison in terms of poises However, an easier comparison can be made by recording the divisions registered on the dial, as the poises run as high as 26,000, whereas the readings on the dial are simple numbers

TABLE II

Gum	Aging Period	Method of Manufacture: Made without Heat	Brought to Boil	Boiled Two Minutes	Boiled Five Minutes	Boiled Ten Minutes
Tragacanth	Original reading	17	19	39	61	61
Aleppo	After 3 months	73	84	90	108	101
No 1	After 10 months	93	117	140	120	115
Karaya	Original reading	14	35	20	21	25
Superior	After 3 months	26	34	27	28	26
Grade	After 10 months	20	19	15	15	10

The above table shows changes in viscosity during a ten month aging period

Comparison

1st Tragacanth produces a thicker mucilage
2nd Tragacanth Mucilage becomes thicker on aging, Karaya becomes thinner on aging
3rd A two minute boiling period is required to obtain thickest mucilages of Tragacanth
4th Application of heat in the preparation of mucilage of Karaya should be avoided

TABLE III

Gum	Aging Period	Treatment	Method of Manufacture. Made without Heat	Boiled Two Minutes	Boiled Five Minutes	Boiled Ten Minutes
	Original	W/o neutralization	91	140	130	110
Tragacanth	reading	Neutralized	85	49	27	27
Aleppo	After two	W/o neutralization	128	140	138	117
No 1	months	Neutralized	160	55	30	29
	After four	W/o neutralization	145	150	150	120
	months	Neutralized	147	48	28	26
	Original	W/o neutralization	68	63	56	46
Karaya	reading	Neutralized	93			
Superior	After two	W/o neutralization	59	63	60	55
Grade	months	Neutralized	64	69	53	44
	After four	W/o neutralization	35	45	40	33
	months	Neutralized	36	27	25	21

The preceding experiments were repeated with three different samples of high grade Karaya and Tragacanth gums, and although slight variations occurred in viscosity, the general results were the same

Karaya gum is five times as acid as Tragacanth Because of the possibility of incompatibility due to the acid, and also to note effect of neutralization, a series of experiments was made in which one-half of each experiment was neutralized The standard formula for the mucilage used in obtaining results for Table II was again used, with a like series neutralized with potassium hydroxide The same standards used in obtaining data for Table II were used in Table III

There is an interesting observation drawn from the above results, *i e*, neutralized mucilages of Tragacanth made with the aid of heat show a stable viscosity, though decidedly less viscous than the mucilage made without neutralization and without heat

This establishes the fact that the acid in Tragacanth effects a decrease in mucilaginous properties when heat is applied to the powdered gum or mucilage Heat should be avoided as much as possible in powdering gum Tragacanth

Because neutralized Karaya mucilage becomes stringy, the results in the above table are of no consequence

In order to present the comparison of the two mucilages in another way which is more applicable, experiments were prepared containing ¾%, 1%, 1½% and 2% of the gums, respectively The solutions were prepared without aid of heat

As the viscosity as determined by the viscosimeter does not definitely indicate the fluidity of a preparation, it was necessary to introduce another test to note this physical property

The standard used to obtain the following data consisted of a glass tube 36 inches long, with a bore of 1 centimeter The number of seconds required for a 30-inch column of mucilage to flow from the tube held in a vertical position was noted

TABLE IV

		% Strength of Solution of Gums Standards—MacMichael's Viscosimeter—No 22 Wire Disc Plunger—8 R P M—No Divisions Revolved Flow Test—30 Inch Column—1 Cm Bore No of Seconds Required to Flow							
		¾%		1%		1½%		2%	
Gum	Aging Period	Viscosimer	Flow Test	Viscosimer	Flow Test	Viscosimer	Flow Test	Viscosimer	Flow Test
Tragacanth	Original reading	11		30		72		211	
Aleppa	After 4 months	18		43		87		235	
No 1	After 6 months	20	6	47	29	94	140	236	
Karaya	Original reading	151		28		64		121	
Superior	After 4 months	8		21		35		91	
Grade	After 6 months	6		13	1	19	3	55	23

Three samples of each gum were tested as shown in the above table and the results were similar

The above results again show that aging increases the viscosity of Tragacanth solution and decreases the viscosity of Karaya solution

Based on the flow test, a 1% solution of Tragacanth has approximately the fluidity of a 2% Karaya solution after aging about six months

CONCLUSIONS

1 Tragacanth has greater mucilaginous properties than Karaya It is necessary to use fully twice as much Karaya to obtain a comparative thick mucilage with Tragacanth

2 Maximum viscosity is obtained by boiling the Tragacanth mucilage two minutes, Karaya mucilage by manufacture without the aid of heat

3 The greater acidity of Karaya should be considered in pharmaceutical preparations as a source of incompatibility

4 Tragacanth mucilage becomes thicker on aging, Karaya mucilage becomes thinner on aging

Karaya possesses the following advantages over Tragacanth

1 More readily soluble One per cent of Karaya can be completely dissolved in water in 30 minutes

2 Karaya mucilage applied to the skin produces a softer effect than Tragacanth

3 Karaya is preferable to Tragacanth when used in hair preparations

Tragacanth produces a very stiff effect to the hair, whereas Karaya spreads better and keeps the hair in place without the conspicuous stiff "board" effect common to Tragacanth hair products

ANALYTICAL DEPARTMENT
PARKE DAVIS & CO
DETROIT, MICH

LIQUOR CALCIS SULPHURATÆ *

BY R A CAIN[1] AND H A LANGENHAN [2]

PRELIMINARY REPORT

Experience in the preparation of Liquor Calcis Sulphuratæ N F has shown that it is almost impossible to obtain a solution of uniform strength by following the N F directions Not only do the finished solutions vary in strength when prepared by different members of a class, but also when made by the same person

The purpose of this investigation was to determine, if possible, whether or not the quantities of lime and sulphur could be reduced, and to outline a method whereby a finished product of a uniform strength could be obtained

A total of 16 solutions was prepared, some according to the directions in the N F while in others the quantities of the ingredients were altered as well as the technique used in preparing the solutions

Two solutions were made according to the N F directions, *i e*, by adding a mixture consisting of 165 Gm of lime and 250 Gm of sulphur to 1750 cc of boiling water The mixture was boiled and reduced to 1000 cc, at which volume it was maintained, while boiling, by the frequent addition of water The mixture was allowed to cool and finally strained through muslin The finished solutions were

* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933

[1] Instructor in Pharmacy

[2] Professor of Pharmacy

assayed for their lime and sulphur content, the results of which are shown in the following table

Solution No	Cc. Collected	% CaO	% S	Total CaO Gm	Total S Gm	% CaO Used	% S Used
1	540 0	16 42	25 9	88 66	139 86	53 73	53 94
2	590 0	10 94	22 3	64 54	131 57	39 11	52 62
Av	565 0	13 68	24 1	76 60	135 71	46 42	54 28

It will be noted that although both solutions were prepared in a similar manner, the amount of finished product finally collected was 50 cc greater in solution No 2 Likewise, the lime and sulphur content varied a great deal, a variation which could not possibly be due to the difference in the volumes of the solutions collected Reference to the table shows that approximately 50% of the lime and sulphur were actually used in the preparation of the solutions

Since nearly half of the original lime and sulphur remained after preparing the solution, it was decided to prepare another series of solutions starting with the same quantities of lime and sulphur, but increasing the quantity of water The increase in the amount of water to be added was based upon the assumption that if starting with 1500 cc of water and concentration to a total volume 1000 cc , an average of approximately 550 cc of finished solution could be obtained, then by using 2250 cc and concentrating to a total of 1450 cc it should be possible to collect approximately 1000 cc of finished product having a lime and sulphur content which, theoretically at least, would differ only slightly from the N F preparation The results obtained are given in the following tables

Solution No	Cc. Collected	% CaO	% S	Total CaO Gm	Total S Gm	% CaO Used	% S Used
7	922 5	10 18	16 20	93 85	149 36	56 87	59 74
8	990 0	8 4	15 08	83 16	149 29	50 40	59 71
9	950 0	8 96	15 48	85 12	147 06	51 59	58 82
10	875 0	8 12	14 86	71 05	130 02	43 06	52 07
Av	934 3	8 91	15 40	83 29	143 93	50 48	57 47

The results show that by increasing the amount of water in order that the volume of the finished product would measure approximately 1000 cc there was a decrease of nearly 5 per cent in the lime and nearly 10 per cent in the sulphur content Taking into consideration the amounts of lime and sulphur actually used in preparing the solutions, it will be noted that whereas in the N F solutions about 46 per cent lime and 55 per cent sulphur were used, in this case the amounts dissolved in solution increased to an average of 50 and 57 per cent, respectively Apparently, therefore, the addition of a larger quantity of water at the beginning of the preparation only slightly increased the total quantities of lime and sulphur which would go into solution Under this condition it is obvious that the percentage strengths of the lime and sulphur would be much greater in the N F solutions

Solutions were again prepared, this time the technique was varied as well as the amounts of the ingredients Instead of adding the N F quantities of lime and sulphur to 1750 cc of water and concentrating down to a total volume of 1000 cc , the formula was computed on the basis of a 1000 cc of water added at the beginning This required 94 28 Gm of lime and 142 85 Gm of sulphur In order to maintain a constant volume, the mixture was boiled with a reflux condenser for three and one-half hours, the length of time required to prepare the solution accord-

ing to the N F directions A volume of 950 cc of finished solution was obtained which assayed 7 64 per cent lime and 11 68 per cent sulphur, thereby using up 77 21 per cent of the original lime and 78 14 per cent of the sulphur Although the percentage strengths of the active ingredients were somewhat lower than the N F products, at the same time the total quantity dissolved was much greater In using smaller quantities of the ingredients less liquid was held in contact with the residue thereby making it possible to collect nearly as much of the finished product as the original water added By reducing the quantities of lime and sulphur to one-third the N F formula and adding 1000 cc of water and preparing the solution in the same manner as the above, 932 cc of finished product were obtained which assayed 4 34 per cent lime and 5 0 per cent sulphur The total quantities of lime and sulphur dissolved amounted to 77 22 and 97 02 per cent, respectively Decreasing the original quantities of lime and sulphur caused a corresponding decrease in their percentage in the finished product It will be noted that practically all of the sulphur went into solution Increasing the original quantities of lime and sulphur failed to materially increase their relative percentage strengths in the finished solution This was shown by the fact that when 215 Gm of lime and 326 Gm of sulphur were used the per cent of lime and sulphur in the finished solution was 9 36 and 19 32 per cent, respectively The total per cent of lime and sulphur used was 40 05 and 54 52, respectively It is possible that a much larger quantity of soluble sulphides were formed but due to the bulk of the residue so much liquid was absorbed that the remaining liquid was insufficient to dissolve them

In order to determine the amount of soluble sulphides which were presumably left in the residue after the preparation of the solution, and which were not dissolved, due to the lack of sufficient liquid, a series of solutions were prepared according to the N F directions

The residue left on preparing the first solution was added to more water and the concentrating and boiling for one hour repeated, and so on, 1750 cc of water were added in each case to the left-over residues in preparing solutions Nos 5 and 6 In No 12, 2250 cc were added to the original ingredients, 500 cc in 12*b*, and 1000 cc in the cases of 12*c*, *d* and *e* The following table offers a summary of the results of this experiment

Solution No	Cc Collected	% CaO	% S	Total CaO Gm	Total S Gm	% CaO Used	% S Used
4	590 0	10 90	22 30	64 54	131 57	39 11	52 62
5	650 0	8 60	7 79	55 90	50 60	55 64	42 72
6	740 0	5 72	2 64	42 32	19 53	94 97	28 79
12*a*	1085 0	2 52	1 69	27 34	18 33	16 57	7 33
12*b*	500 0	6 14	6 90	30 70	34 50	22 30	14 89
12*c*	985 0	3 86	2 54	38 02	25 02	35 54	12 68
12*d*	1050 0	3 50	0 52	36 75	5 46	53 30	3 17
12*e*	840 0	1 24	0 14	10 41	1 17	32 33	0 70

The results seem to indicate that a considerable quantity of sulphides can be dissolved by repeated treatment of the residues with water Reference to solutions Nos 4, 5 and 6 will illustrate this point

From the residue left on preparing solution No 4 there was obtained 8 60 per cent lime and 7 79 per cent sulphur, and when the residue from No 5 was in turn treated with water and additional 5 72 per cent lime and 1 69 per cent sulphur was

recovered There was dissolved, therefore, from the original residue left after the preparation of solution No 4, a total of 14 32 per cent lime and 10 43 per cent sulphur in a total of 1390 cc of finished product Summing up, the original residue yielded a total of 25 26 per cent lime and 32 73 per cent sulphur by the foregoing treatment, and 1980 cc of finished product were obtained The series 12*a*, *b*, *c*, *d* and *e*, showed substantially the same results As a result of repeated treatments of the residues in this series with water, 4460 cc of finished product were obtained before practically all of the lime and sulphur in soluble form had been extracted It will be noted that the final solution prepared, No 12*e*, contained only a small amount of dissolved lime together with just a trace of sulphur

It is quite apparent that the soluble sulphides, which were subsequently dissolved in the finished product by the repeated addition of water to the residues, were formed, during the concentrating and boiling of the original mixture, and that further treatment of the residue with water supplied the necessary solvent If the assumption just made is correct a large quantity of the soluble sulphides, remaining in the residue after removal of the concentrated sulphide solution, could be obtained by washing the residue with additional hot or cold water In this manner a definite quantity of finished product could be collected each time It would seem that this procedure would be much more satisfactory than that of collecting only the liquid which separates from the residue, the amounts of which cannot help but vary each time the preparation is made The N F directions specify that the mixture of lime, sulphur and water be concentrated to a volume of 1000 cc and maintained at this volume, while boiling, for one hour Experience has shown that it is quite difficult, if not almost impossible to keep the volume constant The solution necessarily has to be prepared in large containers and any little variation in volume represents a relatively large increase or decrease in the amount of finished product obtained, and hence the percentage strengths of the lime and sulphur will seldom if ever be the same in different solutions

This investigation is being continued An analysis of the residues and of crystals forming in the solution is now being carried on

UNIVERSITY OF WASHINGTON COLLEGE
OF PHARMACY, SEATTLE

A COMPARISON OF RESULTS OBTAINED BY TWO METHODS OF INSTRUCTION EMPLOYED IN TEACHING PHARMACEUTICAL CHEMISTRY *

BY CHARLES H RODGERS

In the presentation of the subject matter of any course of study an instructor is confronted with the pedagogical problem of how to present the particular course material in order to get the best results with an especial student group immediately at hand To correctly determine what is the best method that should be used for a certain student group is not a simple matter, especially since the instructor usually has little or no advanced information on the average scholastic ability, cooperative desire and interest of the students in the group An experienced instructor will

* Section on Education and Legislation A PH A Madison meeting, 1933

usually ' feel his way" with a new class, departing from the scheduled lecture and quiz periods by increasing the one and decreasing the other, as he thinks best, until he has found the combination that he believes to be the most satisfactory

The problem is further complicated when the quantity of material covered by a course of study is very large and the number of lecture, quiz and laboratory hours assigned to the course is small The course in which comparative studies of the results of several teaching methods has been made is designated as Pharmaceutical Chemistry Three lectures, one quiz and three laboratory periods of fifty minutes each for the winter quarter of 12 weeks, and three lectures, one quiz and four laboratory periods of fifty minutes each for the spring quarter of 12 weeks, or a total of 180 actual hours, are allotted to this course The course is intended to cover those facts about the elements and their compounds which are of especial interest to pharmacists Such a consideration will naturally include official Latin and English titles, common names and synonyms, empirical and structural formulas, official definitions and rubrics, descriptions and physical properties, tests for identity and purity, pharmacological action of ions, chemistry of pharmaceutical preparations, industrial methods of manufacture, etc The laboratory work includes the manufacture of a number of chemical compounds by processes as nearly like the actual industrial methods as possible The student is provided with a textbook covering the material

The vast amount of material in such a course precludes a *detailed* lecture presentation by the instructor and still reserves sufficient time for satisfactory quizzing and laboratory work When the *most important* facts *only* are lectured upon and one oral or written quiz conducted once a week, it has been found that most students delay studying their notes made in lecture and also that portion of their texts covering the subject matter of the lecture until the evening immediately preceding the weekly quiz This they *would* do despite advices to study concurrently with the lectures This was proven time and again by giving unannounced quizzes upon the material presented in lecture on the preceding day and also by students confessing that they had to study in this way because of a heavy schedule The average of student grades made on three unannounced written quizzes was about 62 per cent with only eighteen (18) making passing marks of seventy or better However, when a similar quiz was *announced*, the general average was 79 2 per cent with only twenty per cent of the class having grades of less than 70 per cent but greater than 61 per cent (61%) When the same identical written quiz was given unannounced two weeks later, the examination average showed a general decrease of approximately 10 per cent When given after four weeks, the decrease was only 12 per cent Sufficient data were collected to show that announced quizzes given frequently had the coercive effect of making students study concurrently with the lectures

The assignment of daily lessons from the text and utilizing the entire time scheduled for didactic work for oral quizzing was tried for several weeks When questions dealing with O L T formulas, common names, etc , were asked, the oral quiz marks were quite satisfactory However, when the questions had to do with technology, ion actions, processes, etc , the answers showed a distinct lack of clear understanding This emphasized the necessity of explanatory lectures on certain phases of the work

During the third quarter of the 1932–1933 school year it was decided to try the following method The daily assignment of work to be covered on both lecture and quiz days during weekly periods was posted on each preceding Thursday Immediately upon reporting for class the students wrote a twenty-minute quiz on the material assigned for that particular day The papers were then passed to neighboring students who corrected them during the next thirty minutes, which the instructor devoted to a lecture covering all of the questions asked in the quiz immediately preceding the lecture and, also, to any other material in the assignment needing explanation but not covered by the quiz The papers were handed in at the close of the period and carefully reviewed by the instructor, who then returned them to the students for study

After pursuing this plan (Plan A) for six weeks an examination on the subject matter covered in that time was announced The average grades for these papers was 79 8 per cent On the other hand, when three full period lectures and one oral quiz each week were given for six weeks (Plan B) and an announced quiz given on the material covered, the average for the class was only 62 56 per cent When Plan "A" was employed, the student average grade on the announced quiz showed 17 24 per cent higher than that obtained when the second plan, "B," was used

The estimate of time spent by students in the immediate preparation for the announced-written-quiz given after using Plan A was one and one-half ($1^1/_2$) hours per student (Data obtained from approximately 50% of the students in the class —students selected at random) Inquiries as to the time spent in the immediate preparation for the announced-written-quiz given after following Plan B showed an average of approximately three hours per student There can be no question but that students spent more time in the aggregate preparing for the announced-written-examination given under Plan A and that this time was put in uniformly throughout the preceding six weeks (each night preparing for a 20 minute written test the following day), and furthermore resulted in obviating the necessity of devoting a long study period immediately before the written examination

The "written-quiz-lecture" system, which we have used successfully, is not advanced as a new pedagogical method As previously stated, it is the desire of every true teacher to use that particular method of presenting his subject which will result in the greatest benefit to his students From the composite data collected to date, as well as from the observed general results, we believe that this method is by far the best one employed by us in teaching Pharmaceutical Chemistry This plan does not necessarily work for other courses For example, we have tried the method for several weeks in a course in Operative Pharmacy but have come to the conclusion that for this course the lecture-oral quiz plan gives better results

It is our opinion that the written-quiz-lecture system is a mildly coercive way of inducing students to work for themselves and, when this is accomplished, the problem of the instructor is materially simplified

---

Dedication of the American Institute of Pharmacy at Headquarters Building, Wednesday, May 9th, at 10 00 A M

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING II OINTMENTS *

BY MARVIN J ANDREWS [1]

INTRODUCTION

In the first paper of this series,[2] a report was made of studies undertaken to determine the magnitude and frequency of errors made in the dispensing of powders and capsules This, the second paper of the series, deals with the errors encountered in the dispensing of ointments

Ointments called for on prescriptions are usually prepared by mixing the ingredients on an ointment slab or pill tile with the aid of a spatula In some cases the nature of the ingredients make it necessary to use a mortar and pestle, and occasionally a slab and muller The bases most frequently ordered are petrolatum, white petrolatum, lard, benzoinated lard, anhydrous lanolin, lanolin, a mixture of lanolin and petrolatum, or a mixture of the above bases Ointments are usually dispensed in glass or porcelain jars, less frequently in collapsible tubes

For the purpose of this study, the different types of ointment prescriptions which the pharmacist is ordinarily called upon to dispense were divided into three classes, namely (1) Those which require no handling further than that necessary to transfer the ointment from a stock container to a dispensing jar (2) Those in which compounding involves the incorporation of a liquid with a fatty or hydrocarbon base (3) Those in which the compounding involves the incorporation of a solid with a fatty or hydrocarbon base

With respect to the magnitude and frequency of the error to be expected in the dispensing of these three types, the capacity of the container, the base used, and the method of preparation of the ointment seem to be the most important factors to be considered To determine the extent to which each of these factors contribute to the total error, the following studies were undertaken

EXPERIMENTAL PART

Three series of tests were made The first series of tests was carried out using containers of different capacities, but made by the same manufacturer The objective in this series was to determine the effect on capacity of the following conditions

(1) Difference in nature of ointment bases (*a*) Petrolatum, (*b*) lanolin, (*c*) lanolin and petrolatum, and (*d*) benzoinated lard were used for this purpose

(2) Trituration of each of the above bases on an ointment slab for five and ten minute periods previous to packing

(3) Incorporation of a liquid with each of the above bases

(4) Incorporation of a solid with each of the above bases

(5) Size of jar that is half ounce one ounce and two ounce

The principal objective of the second series of tests was to determine the varia

---

* Section on Practical Pharmacy and Dispensing, A PH A , Madison Wis , 1933

[1] In collaboration with A G DuMez Professor of Pharmacy, School of Pharmacy, University of Maryland

[2] JOUR A PH A , 22 (1933), 755, and 22 (1933), 838

tion in the capacities of jars manufactured by each of the four manufacturers from whom they were purchased

The objective of the third series of tests was to determine the variation in the capacities of jars purchased at random from retail pharmacists in the City of Baltimore

In the actual performance of these tests, the ointment jars were filled in each case by 65 members of the senior class in dispensing pharmacy at the School of Pharmacy of the University of Maryland under working conditions similar to those prevailing in the better type of pharmacies The filled ointment jars were checked for capacity by weighing on a prescription balance, and the standard deviation computed from the results obtained

In the tests made to determine the variation in capacity due to the nature of the base, one series of jars was filled by melting and pouring the material into them, and a second series was filled by packing the base as received into them with the aid of a spatula In filling the jars with melted base, the students were instructed to keep the temperature for melting as low as possible, and in the series filled with the base as received instructions were given to pack so as to eliminate air spaces in so far as possible

TABLE I—EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION

Ointment Base	Treatment and Packing	1/2-Ounce Jar	Average Capacity in Grains of 65 Jars	S D in Grains	Percentage Deviation
Petrolatum	Packed solid		180	21 08	11 71
Lanolin	Packed solid		202	19 14	9 47
Lan and Pet	Packed solid		196	23 78	12 13
Benz Lard	Packed solid		211	26 38	12 50
Petrolatum	Melted and poured		196	16 21	8 27
Lanolin	Melted and poured		216	14 89	6 89
Lan and Pet	Melted and poured		213	20 14	9 45
Benz Lard	Melted and poured		199	26 23	13 18
Petrolatum	Trit on slab 5 min		178	18 65	10 48
Petrolatum	Trit on slab 10 min		177	19 50	11 01
Lanolin	Trit on slab 5 min		191	26 23	13 73
Lanolin	Trit on slab 10 min		185	24 09	13 03
Lan and Pet	Trit on slab 5 min		186	23 54	12 65
Lan and Pet	Trit on slab 10 min		184	26 80	14 56
Benz Lard	Trit on slab 5 min		195	20 55	10 53
Benz Lard	Trit on slab 10 min		187	24 01	12 84
Petrolatum	5% water incorporated		180	23 31	12 95
Lanolin	5% water incorporated		197	18 55	9 42
Lan and Pet	5% water incorporated		192	28 69	14 94
Benz Lard	5% water incorporated		200	31 04	15 52
Petrolatum	5% ZnO incorporated		190	19 27	10 14
Lanolin	5% ZnO incorporated		207	24 57	11 87
Lan and Pet	5% ZnO incorporated		198	23 33	11 78
Benz Lard	5% ZnO incorporated		210	22 95	10 93

It was assumed that the mixing of air with an ointment base would effect materially the weight of the contents of a jar filled with the base To determine if this was actually the case instructions were given to triturate the above-mentioned

bases on an ointment slab with the aid of a spatula for 5- and 10-minute periods previous to packing

In the tests intended to show the effect of the incorporation of a liquid with an ointment base, the students were instructed to use 5 per cent by weight of distilled water

In the tests intended to show the effect of the incorporation of a solid with an ointment base the students were instructed to use 5 per cent by weight of zinc oxide

In the filling of the jars students were instructed to put in an excess of material and level off the top by running the edge of a spatula over it They were further instructed to remove any adhering material by carefully wiping the outside of the jar

The results of the first series of tests are presented in Tables I, II and III

TABLE II —EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION

Ointment Base	Treatment and Packing	1 Ounce Jar	Average Capacity in Grains of 65 Jars	S D in Grain	Percentage Deviation
Petrolatum	Packed solid		369	22 62	6 13
Lanolin	Packed solid		401	32 14	8 01
Lan and Pet	Packed solid		396	29 93	7 56
Benz Lard	Packed solid		405	32 39	7 99
Petrolatum	Melted and poured		390	20 60	5 28
Lanolin	Melted and poured		417	26 24	6 29
Lan and Pet	Melted and poured		415	31 09	7 49
Benz Lard	Melted and poured		397	39 04	9 83
Petrolatum	Trit on slab 5 min		354	31 35	8 86
Petrolatum	Trit on slab 10 min		355	31 63	8 91
Lanolin	Trit on slab 5 min		386	31 25	8 09
Lanolin	Trit on slab 10 min		373	36 80	9 87
Lan and Pet	Trit on slab 5 min		373	45 37	12 16
Lan and Pet	Trit on slab 10 min		370	47 10	12 73
Benz Lard	Trit on slab 5 min		392	36 88	9 41
Benz Lard	Trit on slab 10 min		374	38 28	10 24
Petrolatum	5% water incorporated		362	35 11	9 69
Lanolin	5% water incorporated		396	39 00	9 85
Lan and Pet	5% water incorporated		390	33 30	8 54
Benz Lard	5% water incorporated		399	34 30	8 59
Petrolatum	5% ZnO incorporated		379	34 34	9 09
Lanolin	5% ZnO incorporated		411	37 48	9 12
Lan and Pet	5% ZnO incorporated		389	27 23	7 00
Benz Lard	5% ZnO incorporated		408	40 27	9 87

The accompanying tabulations show that the average capacity in grains increases for the 65 jars packed with the solid base in the following order petrolatum, 50 per cent mixture of lanolin and petrolatum, lanolin, benzoinated lard When the base is first melted and then poured into the jars, the increase in the capacity of the jars is in the following order petrolatum, benzoinated lard, 50 per cent mixture of lanolin and petrolatum, lanolin Likewise, the jars when filled

by melting and pouring show a greater capacity than when filled with the same base by packing in the solid condition, except in the case of benzoinated lard

The increase in capacity when the base is melted and poured is no doubt due to the fact that occluded air is driven out in heating, and to the fact that air-pockets are not formed in filling as is the case when the base is packed as solid

TABLE III —EFFECT OF DIFFERENT CONDITIONS IN PACKING OINTMENT JARS ON THE STANDARD DEVIATION

Ointment Base	Treatment and Packing	2 Ounce Jar	Average Capacity in Grains of 65 Jars	S D in Grains	Percentage Deviation
Petrolatum	Packed solid		735	39 53	5 38
Lanolin	Packed solid		793	52 86	6 67
Lan and Pet	Packed solid		769	46 19	6 00
Benz Lard	Packed solid		816	44 04	5 40
Petrolatum	Melted and poured		773	28 20	3 65
Lanolin	Melted and poured		831	34 51	4 15
Lan and Pet	Melted and poured		804	38 48	4 79
Benz Lard	Melted and poured		774	55 32	7 15
Petrolatum	Trit on slab 5 min		712	58 62	8 23
Petrolatum	Trit on slab 10 min		707	54 31	7 68
Lanolin	Trit on slab 5 min		776	58 73	7 57
Lanolin	Trit on slab 10 min		752	57 92	7 70
Lan and Pet	Trit on slab 5 min		747	53 89	7 21
Lan and Pet	Trit on slab 10 min		730	54 39	7 45
Benz Lard	Trit on slab 5 min		773	52 65	6 81
Benz Lard	Trit on slab 10 min		741	68 18	9 20
Petrolatum	5% water incorporated		733	39 06	5 33
Lanolin	5% water incorporated		775	58 15	7 50
Lan and Pet	5% water incorporated		779	45 86	5 89
Benz Lard	5% water incorporated		786	53 91	6 86
Petrolatum	5% ZnO incorporated		760	51 33	6 75
Lanolin	5% ZnO incorporated		808	57 63	7 13
Lan and Pet	5% ZnO incorporated		794	44 63	5 62
Benz Lard	5% ZnO incorporated		819	48 65	5 94

The decrease in capacity when the jars are filled with benzoinated lard by melting and pouring is due, in part at least, to loss of water by evaporation The expansion of the lard on heating also accounted for a part of the decrease in weight

The standard deviation in the case of the jars filled with petrolatum, 50 per cent lanolin and petrolatum mixture, and lanolin is greater in each instance when the base is packed in the solid condition than when melted and poured The magnitude of the error as shown by the percentage deviation varies inversely to the size of the jar

The direction of the standard deviation in the case of the jars filled with benzoinated lard is directly opposite to that found for the other three bases, that is, the same volume of base weighs more when packed in the solid condition than when melted and poured in the jar

The most important point brought out by the data in the above tables is that the frequency and magnitude of error is greater in the cases where the jars are filled with ointment in the solid state than in the cases where the filling is accomplished by melting and pouring

Unfortunately, in actual drug store practice, the majority of prescriptions for

small quantities of ointments are filled by triturating the ingredients on a slab and packing the finished ointment into a jar with the aid of a spatula This procedure is followed because the application of heat has a deleterious effect on the ingredients of certain ointments and because the preparation of an ointment by fusion requires that it be allowed to stand until it congeals before it is given to the patient, who is usually in the store waiting for it

The tabulated data given above show further that the capacity of a jar by weight is decreased by triturating the ointment on a slab previous to packing in the solid state No doubt this is due to the incorporation of air with the ointment base, thereby increasing its bulk and lowering its specific gravity The time for which the material is triturated also seems to be an important factor, since in practically all cases the greatest decrease in capacity was shown where the period of trituration was ten minutes instead of five In the case of benzoinated lard the fact that trituration results in liquefaction may also be a factor

The incorporation of a liquid of comparatively low specific gravity and which does not readily mix with the base, such as water, appears to produce a decrease in capacity The cause for this has not been definitely determined It is believed, however, that the condition is due to emulsification and the occlusion of air The effect produced by a liquid which is completely miscible with the ointment was not determined

In cases where the specific gravity of the liquid is higher than that of the ointment base and where the liquid is insoluble in the base, an increase in capacity may be expected In the case of the official mercury ointments, for instance, where the mercury content is high, the increase in capacity is enormous as shown in the following table

TABLE IV —CAPACITIES OF OINTMENT JARS FOR MERCURY OINTMENTS

Size of Container	Petrolatum	Mild Mercurial Ointment	Stronger Mercurial Ointment
½ ounce	240 grams	343 grams	425 grams
1 ounce	480 grams	663 grams	838 grams
2 ounce	960 grams	1381 grams	1688 grams

In the case of the incorporation of a solid with the ointment base, it would naturally be expected that the capacity of the ointment jar by weight to be increased if the specific gravity of the solid were higher than that of the base and vice versa if it were lower than that of the base The results obtained in the tests carried out with 5 per cent zinc oxide ointment show that these expectations are realized in so far, at least, as solids heavier than the ointment base are concerned The increase in capacity, however, is not constant but varies with the ointment base used as shown in the above table Evidently physical properties other than specific gravity are factors to be reckoned with, the solubility of the solid in the ointment base for instance Unfortunately, tests were not made with solids lighter than the base, so that actual data on ointments of this type cannot be given at present

For the purpose of making it possible to compare the results presented in Tables I to III with similar data that may have been published, but which have not been expressed in terms of the standard deviation, the per cent of deviation from the average has been calculated and is given in Tables V, VI and VII which follow

TABLE V —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF ONE-HALF OUNCE JARS

Ointment Base	Treatment and Packing	Average Capacity in Grains of 65 Jars	Deviation from the Average Weight of 65 Completely Filled ½ Ounce Jars: 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
Petrolatum	Packed solid	180	46 10%	30 76%	12 30%	6 15%	4 61%
Lanolin	Packed solid	202	70 75%	16 92%	6 15%	3 08%	3 08%
Lan and Pet	Packed solid	196	55 36%	16 92%	12 30%		15 38%
Benz Lard	Packed solid	211	63 06%	13 84%	7 69%	6 15%	9 23%
Petrolatum	Melted and poured	196	66 13%	15 38%	13 84%		4 61%
Lanolin	Melted and poured	216	58 44%	29 22%	12 30%		
Lan and Pet	Melted and poured	213	44 61%	41 53%	6 15%	1 54%	6 15%
Benz Lard	Melted and poured	199	40 00%	24 61%	18 46%	6 15%	10 77%
Petrolatum	Trit on slab 5 min	178	38 45%	35 37%	12 30%	10 78%	3 08%
Petrolatum	Trit on slab 10 min	177	32 30%	27 68%	21 53%	7 69%	10 77%
Lanolin	Trit on slab 5 min	191	38 45%	26 15%	12 30%	10 77%	12 30%
Lanolin	Trit on slab 10 min	185	40 00%	24 61%	16 92%	6 15%	12 30%
Lan and Pet	Trit on slab 5 min	186	46 10%	26 15%	10 77%	4 61%	12 30%
Lan and Pet.	Trit on slab 10 min	184	43 06%	30 76%	12 30%	3 08%	10 77%
Benz Lard	Trit. on slab 5 min	195	55 37%	24 61%	12 30%	3 08%	4 61%
Benz Lard	Trit on slab 10 min	187	26 15%	29 22%	21 53%	10 77%	12 30%
Petrolatum	5% water incorporated	180	24 61%	29 22%	23 07%	10 77%	12 30%
Lanolin	5% water incorporated	197	43 06%	32 30%	16 92%	4 61%	3 08%
Lan and Pet	5% water incorporated	192	49 22%	33 84%	9 23%	3 08%	4 61%
Benz Lard	5% water incorporated	200	53 83%	16 92%	12 30%	6 15%	10 77%
Petrolatum	5% ZnO incorporated	190	33 84%	41 53%	16 92%	6 15%	1 54%
Lanolin	5% ZnO incorporated	207	50 75%	27 68%	12 30%	4 61%	4 61%
Lan and Pet	5% ZnO incorporated	198	36 91%	32 30%	12 30%	6 15%	12 30%
Benz Lard	5% ZnO incorporated	210	52 30%	23 07%	15 38%	3 08%	6 15%

In Table V, the percentage deviations from the average weight of ½ ounce jars show that in a large majority of cases the error is 15 per cent or greater, where the material filled into the jars was petrolatum, lanolin or 50 per cent lanolin and petrolatum mixture, and where the jars were filled by melting and pouring If the filling is done by packing in the solid state, the error in the majority of cases is 20 per cent or more If benzoinated lard is the base used, the error in the large majority of cases is 20 per cent or more, when the filling is done by either of the foregoing methods

In Tables VI and VII, the percentage deviations from the average weight of 1- and 2-ounce jars, respectively, show that in a majority of cases the error falls within 10 per cent when the base is melted and poured into the jars whereas the error is 15 per cent when the base is packed in the solid condition, or when other ingredients are incorporated with the base prior to transferring it to the jar When benzoinated lard is the base used, the error is 20 per cent in the case of one-ounce jars, and 15 per cent in the case of two ounce jars

TABLE VI —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF ONE OUNCE JARS

Ointment Base	Treatment and Packing	Average Capacity in Grains of 65 Jars	Deviation from the Average Weight of 65 Completely Filled 1 Ounce Jars: 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
Petrolatum	Packed solid	369	63 06%	24 61%	9 23%	1 54%	1 54%
Lanolin	Packed solid	401	59 98%	24 61%	9 23%		6 15%
Lan and Pet	Packed solid	396	55 37%	30 76%	7 69%	3 08%	3 08%
Benz Lard	Packed solid	405	55 37%	32 30%	6 15%	1 54%	4 61%
Petrolatum	Melted and poured	390	79 98%	18 46%	1 54%		
Lanolin	Melted and poured	417	69 21%	24 61%	3 08%	3 08%	
Lan and Pet	Melted and poured	415	67 67%	18 46%	10 77%		3 08%
Benz Lard	Melted and poured	397	64 60%	16 92%	10 77%	4 61%	3 08%
Petrolatum	Trit on slab 5 min	354	47 68%	26 15%	19 99%	6 15%	
Petrolatum	Trit on slab 10 min	355	44 60%	29 22%	19 99%	6 15%	
Lanolin	Trit on slab 5 min	386	50 75%	35 37%	6 15%	1 61%	3 08%
Lanolin	Trit on slab 10 min	373	46 10%	27 68%	13 84%	7 69%	4 61%
Lan and Pet	Trit on slab 5 min	373	53 83%	23 07%	10 77%	1 54%	10 77%
Lan and Pet	Trit on slab 10 min	370	55 37%	24 60%	6 15%	4 61%	9 22%
Benz Lard	Trit on slab 5 min	392	55 37%	21 53%	12 30%	6 15%	4 61%
Benz Lard	Trit on slab 10 min	374	38 45%	26 15%	13 84%	12 30%	9 23%
Petrolatum	5% water incorporated	362	44 60%	29 22%	18 46%	4 61%	3 08%
Lanolin	5% water incorporated	396	63 06%	24 61%	6 15%	1 54%	4 61%
Lan and Pet	5% water incorporated	390	56 91%	18 46%	16 92%	3 08%	4 61%
Benz Lard	5% water incorporated	399	64 60%	18 46%	9 23%	4 61%	3 08%
Petrolatum	5% ZnO incorporated	379	53 83%	19 99%	16 92%	6 15%	3 08%
Lanolin	5% ZnO incorporated	411	61 52%	23 07%	7 69%	1 54%	6 15%
Lan and Pet	5% ZnO incorporated	389	55 38%	21 53%	15 37%	4 61%	3 08%
Benz Lard	5% ZnO incorporated	408	58 44%	32 30%	1 54%	1 54%	6 15%

TABLE VII —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF TWO OUNCE JARS

Ointment Base	Treatment and Packing	Average Capacity in Grains of 65 Jars	Deviation from the Average Weight of 65 Completely Filled 2 Ounce Jars: 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
Petrolatum	Packed solid	735	70 75%	19 99%	7 69%	1 54%	
Lanolin	Packed solid	793	61 52%	30 76%	4 61%	3 08%	
Lan and Pet	Packed solid	769	61 52%	32 30%	4 61%	1 54%	
Benz Lard	Packed solid	816	69 21%	19 99%	7 69%	1 54%	1 54%
Petrolatum	Melted and poured	773	90 74%	6 15%	3 08%		
Lanolin	Melted and poured	831	86 13%	9 23%	4 61%		
Lan and Pet.	Melted and poured	804	76 90%	16 92%	6 15%		
Benz Lard	Melted and poured	774	53 83%	29 22%	12 30%	4 61%	
Petrolatum	Trit on slab 5 min	712	52 29%	24 61%	18 46%	4 61%	
Petrolatum	Trit on slab 10 min	707	55 37%	30 77%	9 23%	4 61%	
Lanolin	Trit on slab 5 min	776	59 99%	27 68%	6 15%	3 08%	3 08%
Lanolin	Trit on slab 10 min	752	90 74%	4 61%	1 54%		3 08%
Lan and Pet	Trit on slab 5 min	747	49 22%	33 84%	12 30%	4 61%	
Lan and Pet	Trit on slab 10 min	730	59 98%	24 61%	7 69%	7 69%	
Benz Lard	Trit on slab 5 min	773	53 83%	33 84%	9 23%	3 08%	
Benz Lard	Trit on slab 10 min	741	30 76%	36 92%	27 69%	4 61%	
Petrolatum	5% water incorporated	733	64 60%	27 68%	7 69%		
Lanolin	5% water incorporated	775	56 37%	27 68%	12 30%	4 61%	
Lan and Pet	5% water incorporated	779	64 60%	30 77%	3 08%	1 54%	
Benz Lard	5% water incorporated	786	61 52%	32 30%	6 15%		
Petrolatum	5% ZnO incorporated	760	52 30%	30 77%	15 39%	1 54%	
Lanolin	5% ZnO incorporated	808	61 52%	36 91%		1 54%	
Lan and Pet	5% ZnO incorporated	794	78 44%	13 84%	7 69%		
Benz Lard	5% ZnO incorporated	819	72 29%	18 46%	4 61%	4 61%	

(*To be continued*)

DISPLAY OF DENTAL ITEMS OF THE NATIONAL FORMULARY VI

BY RALPH E TERRY *

Occupying a prominent space in the display of *Dental Pharmacology* at the Mid Winter meeting of the Chicago Dental Society held at the Stevens Hotel, February 26th to March 1st, the Dental Items of the National Formulary VI attracted much attention The Mid-Winter meeting of the Chicago Dental Society attracts members of the dental profession from the entire middle west and visitors from the entire country At the meeting just held, more than 3500 registrants were present

As a part of the scientific exhibits, the College of Pharmacy of the University of Illinois prepared and displayed a number of materials of interest to dental practitioners The exhibit was planned with the cooperation of Professor Gathercoal and Dr Blayney of the Dental Sub-committee It consisted of three sections and occupied 40 feet of wall space Special glassware was provided for the exhibit and no expense was spared to make it as neat and attractive as possible About one hundred placards were used, and nearly that many individual items were displayed

One of the sections consisted of the mouth wash or rinse formulas suggested by Dean Geo C Schicks of Rutgers University, College of Pharmacy, who has been active in this work for some time Three National Formulary items were used, Liquor Antisepticus Liquor Aromaticus Alkalinus and Liquor Sodii Boratis Compositus In addition, four mouth rinse formulas furnished by Dean Schicks were featured Half liter testing bottles were provided and small paper cups made it possible for those interested to test the products Much interest was evinced over this section of the display

The second part of the display consisted of a series of typical dental prescriptions such as analgesics anodynes, sedatives stimulants and local anesthetics These were given on cards as formulas and the finished product was shown In addition a number of simples such as amyl nitrite, ether and other substances were shown This section was planned by Dr Blayney to demonstrate the proper manner of prescribing those official medicinal materials of value to the dentist

The third section of the display consisted of the dental formulas of the National Formulary VI Again the finished product was shown with the formula given on a card Grouped around each product, the materials needed to make each formula were shown This section of the display caused much interest, for the dental profession is becoming very much awakened to the need for knowing what it is using in the practice of dentistry Dental preparations of the National

* Member of the Faculty of University of Illinois College of Pharmacy

Formulary were exhibited The basic idea of this section was to bring to the dentist the work of the N F Dental Sub-committee to date that he might personally examine the preparations and note the formulas as recommended by this Sub-committee and now admitted to N F VI A number of suggestions were made by various dentists regarding these preparations and their uses

A four-page booklet describing U S P and N F products of interest to dentists was published by the AMERICAN PHARMACEUTICAL ASSOCIATION and about thirteen hundred were distributed to interested dentists, care being taken to keep them from the general public Many dentists were pleased to know that formulas for these preparations will be made available to them in the National Formulary VI, and a rather constant question was "when will the book be published?" Formulas of the booklet follow

DENTAL PREPARATIONS OF THE NATIONAL FORMULARY EXHIBITED

Anodyne Paste Dressing—This contains Acetylsalicylic acid Eugenol and Balsam of Peru made up into a paste Used as an anodyne dressing in painful tooth sockets

Dental Liniment of Aconite and Iodine—This formula contains Iodine, Fluidextract of Aconite and Alcohol Used as a counter irritant in acute non septic apical pericementitis Cautiously paint on the gum to avoid undue absorption of an excessive amount of aconitine

Dental Anodyne—Oil of Clove fortified with chlorbutanol presents a splendid local anesthetic used for temporary relief in acute pulpitis

Glycerite of Iodine and Zinc Iodide—The zinc iodide and the iodine offer a stable astringent preparation possessing full antiseptic powers

Camphor Phenol Sodium—Phenol 30 per cent, Camphor 60 per cent and Liquid Petrolatum 10 per cent form a preparation highly antiseptic yet devoid of topical irritation even to mucous membranes

Aromatized Sodium Perborate—The place of sodium perborate in dental practice is well established The pharmaceutical problem of presenting this substance in an attractive form is solved by slightly sweetening with saccharin and flavoring with a volatile oil A mint flavor is offered in the official formula

Solution of Procaine Hydrochloride—This solution contains 2 per cent of Procaine Hydrochloride in sterile normal salt solution *It can* also be prepared with a suitable Ringer's Solution

To each 10 cc of the Solution 0 1 cc to 0 2 cc (1 to 3 drops) Epinephrine Hydrochloride Solution is added just prior to injection

Astringent Tooth Powder—Add Copper Sulphate 2 to 3 per cent or Zinc Sulphate or Zinc Sulphocarbolate 1 to 2 per cent or Zinc Chloride 0 5 to 1 per cent

Abrasive Tooth Powder—Add Silex (XXX Flour) 25 to 50 per cent, or Pumice Flour 2 to 5 per cent

Alkaline Tooth Powder—Add Magnesium Oxide 20 to 40 per cent or Sodium Borate 10 to 20 per cent, or Sodium Bicarbonate 50 per cent

Oxidizing Tooth Powder—Add Sodium Perborate or Magnesium Peroxide 20 to 50 per cent

Dentifrice—The following basic formula for a dentifrice produces a safe cleansing agent

Soap, finely powdered	5 00%
Soluble Saccharin	0 25%
Oil of Peppermint	0 40%
Methyl Salicylate	0 80%
Precipitated Calcium Carbonate to make	100 00%

In turn it may be medicated according to the needs of the patient by incorporating the active medicament in suitable quantity

OFFICIAL SUBSTANCES AND PREPARATIONS EXTENSIVELY USED BY DENTISTS

Abrasives and Cleansers—Castile Soap U S P X Precipitated Chalk U S P X, Pumice Flour N F V Silex (XXX Flour)

Analgesics and Anodynes—Acetanilid U S P X, Acetylsalicylic Acid U S P X, Amidopyrine U S P X Chlorbutanol U S P XI, Fluidextract of Aconite N F V Oil of Clove *or Eugenol* U S P X Methyl Salicylate U S P X

Anesthetics (General and Local)—Chloroform U S P X Ether U S P X, Ethyl Aminobenzoate U S P X Ethyl Chloride U S P X Nitrous Oxide U S P X, Solution of Procaine Hydrochloride N F V

Antacids—Magnesium Oxide U S P X Magnesium Peroxide Sodium Borate U S P X

Antiseptics—Balsam of Peru U S P X, Boric Acid U S P X, Chlorothymol N F VI Iodine or Tincture of Iodine U S P X, Oil of Clove or Eugenol U S P X, Phenol U S P X, Sodium Perborate N F V, Thymol U S P X

Astringents, Styptics and Caustics—Alum U S P X, Arsenic Trioxide U S P X, Glycerite of Iodine and Zinc Iodide N F VI, Glycerite of Tannic Acid U S P X, Silver Nitrate U S P X, Solution of Zinc Phenolsulphonate N F V, Zinc Chloride U S P X Zinc Sulphate U S P X

Cardiac Depressors (Vaso-dilators)—Amyl Nitrite U S P X, Hypodermic Tablets of Nitroglycerin N F VI

Sedatives—Barbital Sodium U S P X, Chloral Hydrate U S P X Sodium Bromide U S P X

Stimulants (Cardiac and Cerebral)—Caffeine U S P X, Camphor U S P X, Hypodermic Tablets of Strychnine Sulphate N F VI, Solution of Epinephrine Hydrochloride U S P X

The sight of a thousand dentists industriously copying the formulas of the preparations exhibited was a pleasing one to the pharmacists serving at the display, for it proves that this phase of pharmaceutical activity has been neglected too long Appreciative comments proved that dentists are interested in this sort of thing and exhibits of official substances should be continued at dental association meetings and expanded in the future

The basic ideal of the entire display must not be overlooked, and this ideal as expressed in placards at the exhibit is to bring about "a closer coöperation between the dentist and his pharmacist"

DONATION OF DRUG JARS

James E Hancock has donated to the Museum of the American Institute of Pharmacy 22 glass drug jars which were owned by his father, the late John F Hancock, president of the AMERICAN PHARMACEUTICAL ASSOCIATION, in 1874

JOHN F HANCOCK

The bottles are 16 inches high and 7 inches in diameter, each container carries the coat of arms of a state, the design is a work of art in gold and pigment below it is the name of the drug which the jar contained and gives to the container its coloration, thus sulphur—yellow, indigo blue, etc These jars are rare and date back to the time when only twenty two states had been admitted to the Union, probably, nowhere is as complete a set and in such perfect condition as represented by this collection

The ASSOCIATION will also receive from the same donor copies of "Theophrastus" and of "Valerius Cordus," both in excellent condition

W F Thiede is the present owner of the John F Hancock Pharmacy at 1501 E Baltimore Street Baltimore few changes have been made in it, honoring the memory of his predecessor, who carried on his prescription practice in full view of the public, the furniture of this department is of walnut and in this as well as other sections of the pharmacy original ideas of the founder are in evidence

---

The American Institute of Pharmacy is dedicated to those who have given of their thought and endeavor to the preservation of Public Health and to the further advancement of Science in Pharmacy

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE A A C P EDITOR OF THIS DEPARTMENT

Editor's Note Some of us may think that the old days when we were compelled to teach incompatibilities for hours on end have gone and we need to give little or no attention to the subject to day With better basic training being given our students we would not have to give as much time to this subject as we used to give in the past However, we must not lose sight of the fact that new incompatibilities are arising every day because new drugs especially new synthetics, are being introduced Prof Mantz sets forth these problems in a clear and lucid way and offers a good suggestion on when and how the subject should be taught —C B JORDAN *Editor*

WHEN SHOULD THE COURSE IN INCOMPATIBILITIES BEGIN AND HOW SHOULD IT BE TAUGHT?

BY HARRY W MANTZ *

The methods used in teaching incompatibilities are, no doubt, similar in all schools of pharmacy Assuming this to be true, any useful methods carried out in one school can be applied advantageously by the others, and I present this paper with the hope that it will give rise to discussions from which we may all profit No matter how efficiently this subject may be taught, there will always be room for improvement

Incompatibility is one of the most difficult and most inadequately taught subjects in a pharmacy school curriculum and it is my thought that if a teacher is honest with himself, he cannot have a feeling of complete satisfaction after he has finished his discussions of the subject I am not criticizing the ability and knowledge of the teacher but refer to the difficulties inherent in the subject itself

Scientific, as well as commercial progress, leads to discoveries and the production of new compounds to be used for the cure of disease, which causes a continual increase in the scope of the subject This is further complicated by the fact that little is known about the composition of many of the so-called proprietary preparations, so frequently prescribed and this makes it difficult to explain many incompatibilities which may arise in combinations containing such products

In order to get a picture of the magnitude of the problem facing us, let us consider the number of prescriptions which could be written, by using one hundred drugs with "four to a prescription" The number of different combinations obtainable amount only to a little less than four millions Now, if we were to include all the medicinal substances known, the total would probably make the war debt figures, which we see in the daily newspapers, look like pin money This gives us an idea of the potential difficulties which may be dormant, but which may suddenly come into existence and face the man in the prescription laboratory Therefore, as teachers, we feel it our duty to train the students so that they will be able to cope with these problems when they arise

Referring more specifically to the subject of this paper, "When Should the Course in Incompatibilities Begin and How Should It Be Taught?" the syllabus allots 64 didactic hours and 128 laboratory hours to Dispensing Pharmacy and

* Temple University

suggests the teaching of incompatibilities as a part of the course While we understand the subject had to be put under some heading, we feel that this particular branch in the training of a pharmacist is of such vital importance that it cannot be adequately taught as a subdivision of Dispensing Pharmacy during the number of hours suggested Pharmacy as an art comes into being in the dispensing laboratory where the final technique is affected At this stage the student is on the verge of putting into practice, in his chosen profession, the knowledge which he has accumulated When this part of his training has been reached, he should have a knowledge of incompatibilities and be able to apply it

Instead of being incorporated as a part of a single subject, incompatibilities can be taught more effectively by dividing them into the three classifications and enlisting the cooperation of the chairs of Chemistry, Pharmacy and Pharmacology The teachers should have two objectives in view *first*, to teach so that the students will gain a fundamental knowledge of their subjects, and *second*, with the idea of training them to use such knowledge as it applies to incompatibilities We all realize that students generally lack the ability to apply what they have learned This teaching should begin as soon as the students have an understanding of the various subjects sufficient to enable them to comprehend the meaning and importance of incompatibilities as they pertain to medicinal substances

The teaching of chemical incompatibilities can have its origin in General Chemistry under the discussions of ionization, and be continued throughout the various succeeding courses in Chemistry In the laboratories prescriptions can be used to illustrate the reactions For example, in giving the test for chlorides, a prescription containing silver nitrate and physiological salt solution could be used to make the student aware of the incompatibility which exists in such a combination

Discussions on pharmaceutical or physical incompatibilities can be included with those of the simplest preparations such as the aromatic waters In the laboratory the student can compound a prescription calling for a bromide to be dissolved in an aromatic water and note what occurs, and then be instructed how to remedy this difficulty In like manner, the student could be gradually trained to handle the more difficult combinations

The pharmacist is not greatly concerned with therapeutic incompatibilities, but the departments of Pharmacology and Toxicology could do their share of the work by referring to the poisonous combinations which may result from chemical changes or unforseen physical incompatibilities

By following these plans the teachers in the laboratories have the opportunity of applying one of the basic principles of learning, "Learn by Doing," and we all agree with the old saying, "Experience is the best teacher " This is really how our veteran forefathers in pharmacy learned their profession, they learned by doing Due to the change of conditions in the profession of pharmacy and to the gradual decrease of practical experience required by the State Boards, the burden now rests upon the shoulders of the institutions and their faculties They are expected to supply ways and means for this training

These are the methods the School of Pharmacy of Temple University uses to teach incompatibilities before the student enters the course in Dispensing Pharmacy

Allow me to explain briefly how we teach that part of Dispensing Pharmacy which applies to incompatibilities and the compounding of prescriptions At this point we know that the student has had instruction pertaining to incompatibilities both in lectures and in laboratories The Dispensing Pharmacy Laboratory, as has been stated, is the finishing department and the work outlined here for the students, as far as this subject is concerned, consists chiefly of an application of the knowledge already gained

We have on file the names of approximately one hundred practicing physicians from whom we solicit prescriptions which they use frequently and we request them to mark those which they have found by experience to have been the most difficult to have compounded satisfactorily This list not only includes physicians in the vicinity of Philadelphia, but those located in different sections of Pennsylvania and a few other states Many names and addresses of physicians are obtained from the students themselves

The prescriptions are placed on cardboards which are inserted into a folder with a leather back and transparent front, and each student is required to copy the prescriptions in a note-book A certain amount of time is set aside during each laboratory period for this work After each student has copied about two hundred prescriptions, he is assigned four on which he writes a detailed description as to the methods of preparation of the ingredients, the methods of compounding and a discussion of any difficulties which might possibly arise This procedure makes it necessary in many cases for the student to refer to the library At the end of the time allotted, each student reads his assignment in class The instructor then answers questions, makes corrections or further discusses the prescriptions, as necessary In this manner each student contributes to and benefits by the research work of the others Many of these prescriptions are compounded during the laboratory hours It is interesting to know that in many cases those students who are working in drug stores compound the prescriptions assigned to them for their own benefit, if they have not been already compounded in the dispensing laboratory In other cases exceptional prescriptions are compounded by the instructor to demonstrate the reactions

Our curriculum contains special hours assigned to the general discussion of difficult prescriptions received in drug stores where our students are employed The students also are urged to make memoranda of any interesting problems which only present themselves in a drug store During this period a representative from each of the departments of Chemistry, Pharmacy and Pharmacology is present to discuss questions which are pertinent to his teaching

By using this system we feel that the student is getting experience which is analogous to that obtained in a drug store He comes in contact with prescriptions which are being used rather frequently, and due to the number of physicians who submit them, he gains valuable experience in reading a variety of handwritings

With the trend of modern medicine toward the use of specifics in the treatment of disease, these problems may not confront the pharmacist in the future as frequently as they have in the past For the present, however, as teachers, we should feel it our responsibility to give the student training which is as practical and comprehensive as possible

To summarize, my thought is that

1 Teaching incompatibilities should begin soon after the student enters the school

2 All teachers should have this subject constantly in mind and select illustrations for their statements from the incompatible group whenever possible

3 This accumulation of theory under the various chairs should then be applied in the course of dispensing pharmacy

4 Better results will be obtained from the use of original prescriptions than from the use of printed formulas

5 The conference on prescription difficulties occurring in the stores from day to day, keeps the instruction up to the minute

---

THE TEACHING OF INCOMPATIBILITIES

BY W G CROCKETT *

Editor's Note The preceding paper by Professor Mantz, together with the four papers following comprise a good symposium on Incompatibilities It is noticeable that the authors are not in entire agreement on when and how this subject should be taught and this to me, is a good sign When we all agree on a time or a method of teaching a subject, we should ask ourselves whether we have not eliminated originality, the teacher s best qualification Two teachers may present a subject in quite a different way and yet secure equally good results I do not agree with some of the authors on when and how incompatibilities should be taught and more than likely the reader would not agree with me should I set forth my opinions What are we to do in this dilemma? Read all the papers those of Mantz Crockett, Johnson, Mitchell and Terry, and cull the best from each of them —C B JORDAN, *Editor*

The subject of incompatibilites in prescriptions is an important one, and one which should not be treated superficially by educators merely because physicians in recent years have become more and more inclined toward prescribing simple-named, manufactured products Evidences of closer cooperation between medical and pharmaceutical groups throughout the country, along with increasing costs of medical care, lead me to believe that as the years go by physicians will return to writing original prescriptions in order to reduce the costs of medical care and at the same time forestall self-medication on the part of the laity If this be true the subject of incompatibilities in prescriptions will be of more concern in years to come than it is at the present time We must teach for future needs as well as for present ones

A complete discussion of the teaching of incompatibilities should embrace both what to teach and how to teach it This subject is so broad and so debatable that I shall not attempt to treat either of these phases in detail, but instead will confine myself to a few thoughts or principles with the expectation that the discussion which follows will bring us many different points of view and thereby be more helpful than my own personal views Any scheme I might present would prove inadequate even to myself I say this because I find myself altering my own approach to the subject from year to year

At the outset I wish to state that I think it a mistake to isolate the subject of incompatibilities and attempt to teach it as a separate course Curricular

* Medical College of Virginia

conditions in the three-year course necessitated my attempting it in this way I found that the students regarded it as a separate entity and failed to associate it properly with dispensing pharmacy I think the didactic and laboratory courses in dispensing pharmacy should treat first of the fundamentals of prescription compounding with emphasis upon technique and the many minor but important details The subject of incompatibilities should develop out of this course, as a part of the course in dispensing pharmacy The discussion of prescriptions in both didactic and laboratory courses should be complete If the subject of incompatibilities is segregated and taught as a separate course under a distinctive title the student is inclined to magnify the importance of the incompatibility, and in his discussion neglect such vital points as the method of compounding, accessory labels and the kind of container in which the prescription should be dispensed

I think a review of the pertinent parts of qualitative analysis is highly advisable I can go further and give you an outline of the method which I followed last year I distributed sets of mimeographed sheets to the students, bearing the more important incompatibilities of the common inorganic and organic compounds I made assignments on these sheets and at the following didactic period distributed prescriptions which set forth incompatibilities mentioned in the assignments These the students discussed both orally and in writing Afterward they compounded some of them in the laboratory

After the sheets had been disposed of, I distributed at each didactic period copies of prescriptions representing incompatibilities in general The students were required to discuss them fully, both orally and in writing, during that particular period Results were gratifying I have been unable to get satisfactory results in prescription discussion by making assignments in a book which points out the incompatibilities, their remedies and methods for compounding Conferences with students after graduation have confirmed my belief that this is poor practice, as it tempts students to memorize rather than think

It is of course understood that teaching problems differ in different institutions In writing this paper I have been influenced undoubtedly by conditions in the institution which I represent A brief explanation may be in order The Medical College of Virginia operates two dispensing pharmacies to take care of the needs of its out-patient department and three hospitals The medical staff rotates, thereby bringing approximately 150 physicians onto the staff during the year Practically all the prescriptions written by these physicains are for official and extemporaneous mixtures The ordering of medicines by stock numbers is not permitted All prescriptions are written just as if they were to be presented at a retail store

Approximately 150 prescriptions are filled daily in these two pharmacies Routine prescriptions which do not constitute experience for students after they have filled them two or three times, are segregated and filled by the full-time hospital pharmacists The others are filled by senior pharmacy students, under close supervision In the past each senior student has served fifteen hours a week for approximately ten weeks in these dispensing pharmacies Now that classes are smaller their periods of service will be lengthened These facilities have enabled us to give much instructional work in incompatibilities in these pharmacies, as

each student is quizzed on each prescription he fills as soon as it is completed This course is supplemented by a laboratory course in prescription compounding, in which types of incompatibilities which do not occur frequently in our dispensing pharmacies, are treated

These articles will be continued in the May number of the Journal

THE NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH

BY JOHN C KRANTZ, JR , SECRETARY

The National Conference on Pharmaceutical Research has sent out its official notices convoking the Thirteenth Annual Meeting This meeting is to be held in conjunction with the AMERICAN PHARMACEUTICAL ASSOCIATION at the Hotel Shoreham, Saturday, May 5th, at 2 00 P M

During the thirteen years of its existence the National Conference on Pharmaceutical Research has served as a clearing house for research in pharmacy and its cognate sciences in the United States It has annually compiled a Census of Pharmaceutical Research which has been most useful in determining the increment of progress of research in pharmacy during the year Besides, this census serves as a stimulus to research workers in the field In addition, under the auspices of the Conference, the Symposium "Fighting Disease with Drugs" was published for the purpose of telling the story of pharmacy in a more or less popular style

For the past two years the Conference has awarded annually a fellowship of five hundred dollars to graduate students in universities pursuing courses for the doctorate degree, whose research was of a pharmaceutical nature

During the coming year the Conference will endeavor to compile the reports of the various committees, written in a simple, narrative form, in a volume indicated as The Annual Survey of Pharmaceutical Research It is our hope that this new publication will adequately tell the story of the advance in pharmacy each year and like the Census of Research serve as a stimulus to workers in the field

The Conference anticipates a successful meeting in Washington, and takes this opportunity to invite those interested in the various ramifications of pharmaceutical research to attend its sessions and to participate in its deliberations

RESEARCHES AT THE MELLON INSTITUTE

Among the results of the investigations it has been determined that no systemic pharmacological effects can be ascribed directly to absorbed aluminum, it does not appear to be cumulative in the tissues No harmful effects were shown from soluble aluminum occurring naturally in foods or from utensils

Recent investigations which are being carried on with the coöperation of Mellon Institute have indicated probable valuable application of sodium metaphosphate in the field of veterinarian medicine One of its uses is for preparing solutions for washing and rinsing dogs and other furred animals

WASHINGTON BOTANIC GARDENS

Development of the old site of the Botanic Gardens into Union Square and the proposed transfer of the new Botanic Gardens from jurisdiction of the Joint Committee on the Library of Congress to the Department of Agriculture recall the origin and development of this old institution, which has been in existence for more than a century

The establishment of a botanic garden was the subject of correspondence between Washington and District of Columbia officials It was in 1820, after years of discussion, that the Columbian Institute for Promotion of Arts and Sciences obtained passage of a bill in Congress which became a law on May 8th

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council" —Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

BALTIMORE

The regular monthly meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Hotel Emerson on Tuesday, February 27, 1934

President Cole opened the meeting and the usual business was deferred The meeting was turned over to Mr John A Strevig, of Eli Lilly and Company who presented a sound film entitled, The Production and Clinical Application of Insulin'

The picture portrayed the various steps in the production of insulin on a huge scale, the numerous control procedures involved and the final standardization of the product The second portion of the film was devoted to the application of insulin in the treatment of the diabetic in the clinic One of the most interesting exhibits presented was a young man who has received as many as ten thousand injections of insulin in the past ten years without infection from the injections A truly remarkable record for a remarkable drug

At the conclusion of the presentation a rising vote of thanks was extended to Mr Strevig and the company which he represents About seventy five attended the meeting

MARCH MEETING

The Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was host to the members of the Boards of Pharmacy and the Faculties of the Colleges of Pharmacy in District No 2 at their March meeting

The evening was devoted to a dinner given in honor of the visiting members of these associations The dinner held at the Emerson Hotel, was an unusually delightful affair The speaker of the evening was Dr Huntington Williams Commissioner of Health of Baltimore City, who had for his topic, 'Relation of Pharmacy to Public Health" Many notable personages in pharmacy and medicine were present After the conclusion of Dr Williams' address President Cole called upon many of the deans of the Colleges of Pharmacy and others for a few remarks which were rendered in a humorous manner with due attention to the more serious nature of the meeting

Approximately fifty guests attended the dinner meeting and also a number of the local members of the Baltimore Branch A PH A The address by Dr Huntington Williams follows

RELATIONSHIPS BETWEEN PHARMACY AND PUBLIC HEALTH *

BY HUNTINGTON WILLIAMS M D, DR P H

Medicine and Pharmacy are sister sciences which have traveled hand in hand down the centuries from prehistoric times and ever since self preservation has been instinctive in the human

* Address delivered before the Boards of Pharmacy and the Faculties of the Colleges of Pharmacy in District No 2 Baltimore Maryland March 12, 1934

race Preventive medicine has an equally long heritage, but only recently has it emerged as a full fledged specialty in the medical family, with new scientific bases and techniques of its own The aims of medicine and pharmacy have always been the same, namely, the protection or restoration of health Of late, however, there has been established a new focus of attention, the *keep well* rather than the get well point of view And now in 1934 we find ourselves five years along in a new era, faced with new problems resulting from a world apparently out of gear—a topsy turvey world created, it seems, from the golden prizes which human greed and selfishness have ever held just out of reach If ever there was a time when teachers were needed to set an example and stress the return to the old fashioned ideals of unselfish service, it is now With this thought in mind, I would direct your attention for a few moments to some of the mutual relationships between public health and pharmacy

The goal which modern medicine is gradually setting for itself, which indeed the intelligent modern layman is demanding of it, is a *keep well* service, which from the prenatal period to the grave seeks to prevent needless sickness and suffering and to postpone the arrival of the grim reaper just as long as possible Whereas the old style public health was largely a restrictive or *police* type of service, based on inadequate scientific knowledge, the modern health movement is almost entirely *educational* in its viewpoint The health officer of to day tries to teach his people the thousand important ways of keeping well

It would seem that in pharmacy, too, the National Association of Boards of pharmacy has recognized the need for spreading the newer information and has established a Department of Education which issues a special Bulletin When the health officer looks about him he sees at once that he is faced with a mammoth task—to achieve success it is imperative that the teaching of the essentials of keeping well must be integrated into all the educational processes going on about him Their range is rather staggering This evening I would emphasize one of the special educational fields in which adequate public health instruction is essential and in which a closer liaison may perhaps be built up between pharmacy and public health

This special field is that of higher or professional education, the field which, for our purposes includes the medical schools, and the schools of nursing, dentistry and pharmacy In this field the opportunities have never been greater nor the responsibilities more definite for placing in proper focus in the curriculum the attention which should be paid to instruction in public health and the modern aspects of preventive medicine

To day the graduates in all these special groups are expected to practice their professions along preventive lines To do this each group must know much of the principles of the modern public health movement, which is so wide in its scope as to embrace the preventive aspects of all the special fields The curricula of these professional schools are rapidly expanding to include the *keep well* viewpoint The tremendous need for this in schools of pharmacy is clearly expressed in the following statement taken from the introduction to a volume known to most of you here to night, The Basic Material for a Pharmaceutical Curriculum "

' Conspicuous among the duties of the pharmacist is the group which deals with public health These activities constitute his major function in connection with social and community life Filling prescriptions correctly is, of course important to the public as is also the display and sale of reliable products, but in the service to public health the pharmacist serves the community in a unique way Naturally, there are many sources from which the public may secure accurate health information—the public schools, the newspapers, and the publications of federal, state and private agencies These all contribute their part to the solution of health problems, but the information they provide is general, and must be made specific in order to meet the personal needs of the one who is confronted with specific troubles of his own To give this personal assistance the doctor is at hand But many people are afraid of physicians and hospitals More over, the physician keeps office hours which are relatively inconvenient for people who are busy with their own affairs In addition to this, charges for consultation and treatment, even though modest often keep the public from seeking the advice of a physician

"The pharmacists are therefore more strategically situated than any other group of individuals to give personal advice upon matters of public health on which they are informed The information is given free of charge and can be secured within easy walking distance of the home The materials necessary for controlling the health problem are in stock and can be obtained promptly Queries about health facts are casually asked by interested customers Odds and

ends of information not easily accessible in the health literature can be gained in such conversations with a pharmacist A well-informed pharmacist is the best single individual to disseminate information about public health "

Certainly if this be true a tremendous responsibility rests upon those persons who are charged with the training and licensure of future pharmacists and the post-graduate instruction, such as there may be, of those now in the field You who are the ones to shoulder such a burden in this portion of the country should find the health officers and their colleagues in the medical profession more than willing to ally themselves with you in a common purpose

What are some of the practical ways in which the graduate in pharmacy may best fit himself into the public health machinery of his own community? First of all, I feel that the man in charge of a corner drug store would want to select from his acquaintance some particular physician in whom he has great confidence and to whom he would feel free to turn for suggestions and guidance in the many problems of his daily work that may have a direct bearing on the practice of medicine, both curative and preventive Then, I believe the pharmacist would wish to establish a personal relationship between himself and some representative of the local health department or board of health in his community so that by informal telephone communication he would, at any time be able to secure the point of view of the official health authorities on a multitude of problems closely connected with his own work

What are some of these special public health problems which day after day confront the man behind the counter? Among the very first should probably be mentioned the matter of the venereal diseases which probably is the biggest and most difficult of all public health problems Here again the volume on basic curriculum material in pharmacy includes the following wise statement

' The venereal diseases annually exact an enormous toll of health, happiness and efficiency The very great frequency with which pharmacists are consulted with respect to the treatment of these diseases places them in a special class from the standpoint of a student of pharmacy Probably there is no public health problem in the solution of which the coöperation of the pharmacist is so desirable as the education of the public with regard to the dangers of these diseases and the importance of observing the laws and ordinances promulgated for their control "

The prevalence of the venereal diseases in our community was recently studied in a careful manner by the United States Public Health Service, with the resultant estimate of approximately 10,000 fresh cases of venereal diseases in this city each year and an approximate total of 10,000 cases constantly under treatment in this city Health officials are still baffled in many communities by what amounts to a conspiracy of silence in connection with this problem and by a great public apathy in regard to it Gradually, but by very slow educational methods, we are striving to reach a more open-minded public approach to this great question In the meantime we know of the tremendous temptations which beset the pharmacist for ' over the counter ' diagnosis and treatment by the promiscuous sale of remedies of doubtful value The man behind the counter, of course, should do his best in determining whether his client can afford a family physician and in obvious cases where this is economically impossible, the pharmacist should know of the nearest health department venereal disease clinic or hospital dispensary and refer his customer to it

In the matter of tuberculosis we are faced with somewhat the same problem The patent medicine and the cough mixture are easy to dispense, but the pharmacist who takes his responsibility seriously will worry considerably as to whether the cough or cold has been of long duration and again should know of some tuberculosis clinic or dispensary in case his client is apparently an indigent It was not many months ago that I stopped at a corner drug store one evening and witnessed a young assistant in charge, scarcely more than twenty years old, who took from the shelves what was apparently a patent preparation for a customer who said he had a pretty bad cough Just which of a large variety of commercial products was to be selected was determined by the remark of the young fellow behind the counter that he knew this particular brand was said to be useful in "lubricating the bronchial tubes " This settled all questions in the mind of the purchaser who went away satisfied, although I left with a feeling that the bronchial tubes were not just like a set of piston rings, in need of lubrication

The pharmacist comes close to the public health program in the matter of the handling and distribution of many biologic products, such as sera, antitoxins and vaccines For ten years it was my official duty to make periodic inspections of public health laboratory supply stations,

established in drug stores, and I was constantly amazed at the indifference with which some very perishable biologic products were stored in an ice box, it would seem merely for the sake of appearances and quite regularly without the use of ice It certainly must be true that many young children are vaccinated time and time again without success, because the vaccine virus has not been kept on ice either at the pharmacy or in the physician's office

Of course the public will ask at the drug store for all types of information on personal hygiene including the prevention of such diseases as diphtheria and typhoid fever I see no reason why an up to date pharmacy should not have a rack accessible to all its customers which might be filled with a carefully selected set of leaflets and pamphlets issued by the recognized health authorities and prepared for free public distribution as high grade educational material on these and many other problems of personal and community health Again the customer will ask for the latest information in regard to nutritional problems, which brings up the whole matter of an apparent present day tendency to overadvertise the vitamins In this field I have a strong feeling that the whole vitamin business has been so thoroughly and unjustifiably commercialized with the misleading advertising which is so rampant in our day that modern scientific developments are often asked to bear premature and excessive burdens This same feeling would apply in like manner to a host of other problems which face the pharmacist in his daily work and which we trust may, in some manner be improved by the enactment of a new federal food and drug bill

The pharmacist is called upon at any hour to render first aid and of course must always have a knowledge of toxicology which often has an important bearing on preventive medicine and public health So, too, he must have a knowledge of the essentials of maternal and child hygiene as well as a general understanding of the practical problems of community sanitation, including the purity of public water supplies and of milk and food supplies

It would be a needless task for me to attempt to bring before you any complete review of the endless inter relationships between the work of pharmacy and public health You will agree I feel sure, that to instil into the pharmacist a desire for a thorough knowledge of the modern public health campaign is really about all that is necessary If he does not lose this desire, he will continue to keep up to date and be a most valuable member in the great army of public health workers in his community There can be no doubt that in this matter all of us have a great and common task which is largely educational in nature Concerning it, I for one, am filled with optimism for the future

The lessons of the last five years have been hard, but necessary ones The period since 1929 has been one of a great awakening—and came at the end of a decade when all classes were worshiping the golden calf The house of cards has pretty well fallen and with the depression may come a return of common sense, and a desire to understand and coöperate for the public good Evidences of such a tendency may already be seen in the proposed changes in the national food and drug bill, which will be supported by the sister sciences of pharmacy and public health As Dr Robert Swain has pointed out—legislation in pharmacy as in other fields should be based on sound public interest and not on selfish motives It is not too much to hope for a clearer focus on spiritual values in our every-day work where much will depend on the honor and integrity of the individual We may be well-content to follow the way of life of perhaps the greatest modern physician, William Osler He did his day's work as best he knew how and was willing to leave to destiny the outcome of his labors

CHICAGO

The monthly meeting of the Chicago Branch was held on March 20 1934 at the University of Illinois College of Medicine

A Symposium on Hospital Pharmacies" was presented by the following active members of the Branch Wm Gray of the Presbyterian Hospital I A Becker of the Michael Reese Hospital, S W Morrison of the University of Illinois Research Hospital

The discussions brought out the many differences between the hospital pharmacies and the retail drug stores The number of prescriptions filled calls for the purchasing of drugs in large quantities A comparison of the relative value of a drug as compared to another similar acting drug of less cost must be made as the hospital expense for drugs can be materially lowered where such large amounts are used

Definite systems in the filling of the prescriptions are used to promote efficiency accuracy and time saving

Mr Becker mentioned that powders and capsules are not prescribed at the Michael Reese Hospital as much time can be saved by dispensing the same medicaments in liquid form Large quantities of the fast-moving medicaments are prepared in the form of 100%, 50% and 25% solutions

Mr Gray mentioned the interesting point that at the Presbyterian Hospital a committee exists the pharmacist being an important member of this committee, that meets and discusses the new preparations placed on the market as to merit and price In all cases official and non secret medicaments are used where possible

Mr Morrison, in the course of his discussion presented a comparison of the prices of manufactured products to those made by the hospital pharmacists The resulting figures should be an incentive to all pharmacists to manufacture more of his official preparations

Exceptions were cited where it is practically impossible for a pharmacist to manufacture some preparations, and would be cheaper also to purchase from the large manufacturing concerns

After a five-minute recess the meeting was again called to order and Mr Morrison presented a series of incompatibilities that he had encountered at the hospital Methods of overcoming these were shown and discussed

LAWRENCE TEMPLETON *Secretary*

DETROIT

The February meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at Webster Hall, February 22nd A special Washington Birthday dinner preceded the meeting and a large gathering turned out to hear Director Parr which was augmented by the attendance of the members of the Board of Pharmacy

Owing to the absence of President Felix Johnson, the meeting was called to order by Treasurer Fred Ingram He introduced the University of Michigan alumni, including Clarence Weaver, Leonard A Seltzer, Glenn Staines, N M Henry and Prof C C Glover and Norman A Weess of Everett and V C Piaskowski, new members of the Board of Pharmacy

The Colleges of Pharmacy were represented by Dean R T Lakey of Wayne University, Prof R. L Donon of Detroit Institute of Technology, and Dr Howard B Lewis of the University of Michigan Dr Lewis confirmed his previous invitation to hold the May meeting of the Detroit Branch, in conjunction with the Pharmaceutical Conference of the College of Pharmacy of the University of Michigan on May 17, 1934

S R Klegon represented the clerks Mr Ingram then introduced the speaker of the evening, another University of Michigan Alumnus Director of Drugs and Drug Stores, E J Parr

The director presented a very interesting picture of the many problems confronting pharmacy in Michigan He said the retail druggist must have protection against outside interests that are making strong inroads on the legitimate drug business He referred to the vendors particularly and the patent medicine stores During the last thirty days 125 vendors were licensed by the State and 15 convictions obtained for vending without a license

The Michigan Clinical Thermometer Law was referred to by Director Parr as needing amendment He claimed Connecticut, Massachusetts and New York alone had satisfactory thermometer legislation

Mr Parr predicted the grading of drug stores in the near future into three classes—the professional semi professional and merchandising stores He said standards must be set up for qualification and inspection to include equipment scales, weights and pharmaceuticals carried in stock The Board of Pharmacy can only do what the laws allow, therefore, the answer is with the pharmacist, the Board is empowered to make rulings but not laws

The listeners were astounded to learn that about one thousand manufacturers of medicinal preparations by non pharmacists were established in kitchens, barns, etc, in Michigan over which the Board has practically no control A $20 license is required for every dog remedy, veterinary medicines are controlled by the State but no such control is exercised over medicines for humans He pointed out that the drug laws in Michigan were very indefinite and offer very little protection to the druggist and even less to the public health Improvement of the pharmacy laws which are unjust to the future generation was urged The Board of Pharmacy desires to have qualified pharmacists, within the last month three drug store licenses were revoked for not operating according to the law The Board at all times must consider the public health

The pharmacists were informed that on July 1, 1934, new numbers were to be issued to drug stores in order to give an accurate check on the number of stores operating in Michigan At present 5500 licenses have been issued with less than one half of that number active

A general discussion followed, led by Dean R T Lakey

On motion of Prof C C Glover, a rising vote of thanks was given to Director Parr for his enlightening and interesting talk, which brought a most profitable and pleasant evening to a close

BERNARD A BIALK, *Secretary*

UNIVERSITY OF FLORIDA STUDENT BRANCH

The March meeting of the University of Florida Student Branch was called to order at 5 10 P M , March 21st, by President Jones

A discussion of the action to be taken by the Local Branch on a design for appropriate insignia was participated in by members Coniglio, McLean and Johnson The matter was deferred until such time as all other Student branches had answered requests for opinions

There being no further business, President Jones called for nominations for officers for the coming year The following were nominated

For *President*, Frank L Coniglio

For *Vice President*, Arthur Goldstein, Robert L White

For *Secretary*, Richard S Johnson

For *Treasurer*, Paul Fehder, Dale Roth

On voting (by secret ballot) Messrs White and Fehder were elected to the offices of *Vice President* and *Treasurer*, respectively There being only one nomination for each of the other offices the secretary was instructed to cast a ballot for Messrs Coniglio and Johnson for the offices of *President* and *Secretary*

After appropriate remarks by retiring President Jones and President-Elect Coniglio the meeting was adjourned FRANK S CONIGLIO *Secretary*

NEW YORK

The March meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on March 12th, in the College of Pharmacy, Columbia University About one hundred members and their guests attended

President Ballard was in charge of the meeting After the meeting was called to order, the report of the secretary was read and accepted

Chairman Kassner, of the Professional Relations Committee then announced the Physicians and Pharmacists' Meeting to be held on March 29th in the Academy of Medicine under the auspices of the Academy of Pharmacy Every one present was urged to attend

Chairman Dauer of the Committee on the Progress of Pharmacy then reported on the following new remedies

Mercupurin—an organic compound of a mercurial salt and theophylline It is used in cardiac edema, cardiorenal edema and for cirrhosis of the liver It is a powerful diuretic.

Pentnucleotide—a mixture of the sodium salts of pentose nucleotides It is used in cases of agranulocytic angina

Novatropin—methylhomatropine bromide Its paralytic action is comparable to that of atropine and it is eight to ten times as potent as homatropine However, it is less than one thirtieth as toxic as atropine

President Ballard presented the guest speaker for the evening, Dr Ernst Boas, who discussed "The Heart and Its Diseases"

Dr Boas began by giving some very interesting statistics on heart diseases He showed that the death rate from heart diseases was gradually mounting, but that in some age classes decreases were to be noted However, improved methods for diagnosis made comparison of recent figures with old rather unreliable, for, not many years ago, heart disease diagnosis had not reached a point comparable with methods employed to day

Having briefly reviewed the mortality statistics Dr Boas went on to discuss the causes of heart diseases These he grouped into four classes

1 Rheumatism
2 Syphilis
3 High blood pressure
4 Arterio sclerosis

The latter two go hand in hand, making really but three causes After emphasizing that methods for preventing heart diseases were unknown, Dr Boas went on to discuss progress made in controlling the diseases which lead to heart afflictions For younger persons, rheumatic fever, is a primary cause of heart disease By reducing the prevalence of this disease some progress in conquering heart disease has been made

The speaker went further to explain that a definite type or kind of heart disease develops from rheumatic fever, and that every fresh attack of the disease causes new heart damage

About five to ten per cent of the adult cases of heart disease can be traced to syphilis This disease can now be controlled and hence, heart disease from this cause can be controlled However, heart damage usually has already taken place by the time a diagnosis is made The heart damage is usually upon the valves of the aorta

High blood pressure is important as a cause of heart disease It generally runs in families, and is probably due to some disturbance in the flow of internal secretions The heart must work harder under such circumstances and it gradually enlarges and weakens This usually requires many years and heart failure finally results

Arterio sclerosis is a sign of senility It usually occurs in persons after forty It may bring on apoplexy, or the kidneys may fail Arterio sclerosis picks out the vital organs for its attack

Dr Boas then showed numerous slides which illustrated many points covered in his talk thus far He also showed some extremely interesting graphs made with an electrocardiogram and explained fully what use the specialist made of this information to aid him in his diagnosis

In his concluding remarks the speaker made clear that there are heart diseases, specific afflictions of the heart, and that a single expression to describe all of these was misleading He again pointed out the diseases which precede heart diseases and discussed their control as far as possible In treating heart diseases many new remedies are being tried Digitalis is, of course, a standard But quinidine is being used in some types with marked success Many mercurial organics are being used for their diuretic properties, and large doses of urea and ammonium chloride are also used for the purpose

Finally, Dr Boas repeated that we do not know how to prevent heart diseases but that this subject was receiving very considerable attention and much study was under way

After answering several questions a rising vote of thanks was accorded Dr Boas for his highly informative discussion

RUDOLF O HAUCK, *Secretary*

NORTHERN NEW JERSEY BRANCH

The March meeting of the Northern New Jersey Branch was convened at the Rutgers University College of Pharmacy on March 19th, by President Little

Plans for the April meeting at which time we will have the pleasure of entertaining the physicians of this neighborhood, were discussed Professor Schicks in detailing the arrangements for the evening explained that the only ticket of admission required of the pharmacists who attend will be that they are accompanied by one or more medical friends

The program is to be made up mostly of demonstrations illustrating the compounding of type prescriptions, the use of new apparatus in prescription work, and the manufacturing of galenical preparations The Rutgers University College of Pharmacy is turning over its laboratory facilities and staff for this work

In addition to the practical laboratory demonstrations, the Hudson County and Elizabeth Pharmaceutical Associations will have exhibits which display the work of the prescription room to excellent advantage Parke Davis and Company and Eli Lilly Company are also coöperating with displays of glandular products

The Nominating Committee reported the names of the following candidates for officers of the Branch for the ensuing year *Honorary President*, Philemon E Hommell, *President*,

Ernest Little, *Vice-President*, G C Schicks, *Secretary*, L W Rising, and *Treasurer*, A F Marquier The candidates were elected by unanimous ballot

Professor O P M Canis gave a short talk on the rapid return of Pharmacy to botanical materia medica He felt that the trend was very definitely in that direction and in order to profit by it pharmacists should begin an intensive study of the U S P and N F herbs Drawing many illustrations from his forty-five years' experience as a retail pharmacist he vividly portrayed the potentialities of this swing in prescription writing

To complete our evening of professional discussions Professor C L Cox presented a talk on emulsions The theoretical considerations were nicely balanced with the practical manufacturing problems arising both in the making of emulsions, and the preventing of their formation at times when their presence would disrupt certain processes By means of laboratory demonstrations made while he talked Professor Cox forcibly illustrated many oddities in emulsion making, and the use of different types of equipment

L W Rising *Secretary*

NORTHERN OHIO

A joint meeting of the Northern Ohio Branch of the American Pharmaceutical Association and the Western Reserve University Student Branch, A Ph A, was held in the Faculty Club of Western Reserve University, Cleveland, Ohio, April 13, 1934 The meeting was under the auspices of the Student Branch and was preceded by a dinner, the guest of honor being Secretary M N Ford of the Ohio State Board of Pharmacy and secretary-treasurer of the Conference of Pharmaceutical Law Enforcement Officials

After the dinner, the meeting adjourned to the class room auditorium of the School of Pharmacy where the membership and others interested in Pharmacy listened to a very much worth-while and interesting talk on Mr Ford's experiences, covering a period of more then twenty years, as secretary of the Ohio Board of Pharmacy and as an enforcement officer of Pharmacy laws

Some Court decisions were reviewed and some episodes touched upon in order to demonstrate the fact that the path of a law enforcement official in fields of professional practice is not a rosy one However, it was pointed out, there seems to be a gradual improvement all along the line in Ohio and other states of the nation due, largely, to the concerted efforts of the members of the Pharmaceutical Law Enforcement Conference

Mr Ford congratulated the Student Branch on its manifested interest in better pharmacy and assured the members that the future of professional pharmacy and its ethical practice will be influenced in no small degree by groups similar to those that composed this joint meeting

Just previous to the dinner meeting the Council of the Northern Ohio Branch, A Ph A, in addition to some routine business matters adopted the following resolution

RESOLUTION ON THE DEATH OF HERBERT E BENFIELD

Whereas, Our highly respected and much beloved co worker, Herbert E Benfield passed away on February 26, 1934, and

Whereas, Mr Benfield was one of the founders of this organization and held its ideals and purposes in the highest esteem, and,

Whereas, His exemplary service as president and committeeman, along with his regular attendance when not in office amply demonstrated his willingness to make more than lip contributions and,

Whereas, His exceptional friendliness and genial fellowship his kindliness and toleration won the admiration and endearment of all his associates

Resolved, that we express our deep sorrow at his death and extend to his widow and relatives our heartfelt sympathy in their hour of bereavement

Resolved, that a copy of this resolution be sent to Mrs Benfield, be entered in our minutes and be sent to the Editor of the Journal of the American Pharmaceutical Association

N T Chamberlin, *Secretary*

PHILADELPHIA

The March meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the auditorium of the Philadelphia College of Pharmacy and Science, on Tuesday evening, March 20th

The occasion was that of the annual dinner tendered by the members of the branch to its past-presidents in honor of their loyalty to the organization

The following past-presidents attended and each was called upon by President Eby for a word of greeting and a few appropriate remarks W A Pearson, E Fullerton Cook, Ambrose Hunsberger, W W McNeary Brua C Goodhart, Raymond Hendrickson Adley B Nichols James C Munch and William J Stoneback Although topics were not assigned these speakers the general trend of their discussion concerned the necessity for advancing the pharmaceutical profession with an outlook toward its future Favorable legislation to abolish unsatisfactory conditions, cooperation with other similar professions, the need for a social survey for pharmacy and for increased pharmaceutical research were among the suggestions offered by the various past presidents

An illustrated talk on The Appreciation of Art" by Mr V McCormick was then enjoyably received by the group

Near the close of the meeting the annual reports of the secretary and treasurer were read and approved, and the chairman of the Nominating Committee presented a list of officers for the coming year The following were unanimously chosen

President, Alfred Barol
First Vice President, Theo A Campbell, Jr
Second Vice-President L L Miller
Secretary-Treasurer, Edmund H MacLaughlin

President Eby thanked the members assembled for their coöperation during his term of office and after installation of the new officers the meeting was adjourned

EDMUND H MACLAUGHLIN, *Secretary*

NORTHWEST PHARMACEUTICAL BUREAU ELECTS OFFICERS

The following officers were elected *President* J P Jelinek, St Paul *Vice Presidents* J J Gillespie, Des Moines and John Heerema, Pella, Iowa, *Treasurer*, Robert M Gibson Des Moines Iowa, *Secretary* Rowland Jones Gettysburg, South Dakota, *Advisory Secretary*, Frank M McCabe, St Paul *Executive Committee* N Vere Sanders, Albert Lea Minnesota P J Jepson, Newton, Iowa John Veenker Northwood Iowa and W F Sudro, Fargo, North Dakota

OKLAHOMA CITY EMPLOYS PHARMACIST

After quite a discussion of the Oklahoma City officials with the State Board of Pharmacy, Oklahoma City has decided to employ a registered pharmacist and Frank Weaver has been named as pharmacist There was quite a contention over the matter, the city attorney having ruled that Oklahoma City was within its rights in dispensing drugs without a pharmacist

FOUR NEW VETERANS' HOSPITALS TO BE OPENED

Four new veterans' hospitals with an aggregate capacity of 963 beds built at a cost of $3 002 014 are to be placed in commission as a result of liberalization of the veterans' relief regulations promulgated under the Economy Act of 1933 The institutions are in Batavia N Y, Cheyenne, Wyo, Des Moines, Iowa, and Fayetteville, Ark Two other hospitals are under construction a general hospital at San Francisco, and one for nervous and mental diseases at Roanoke, Va

THE WEIGHTS AND MEASURES LAW IN CHINA

The Commercial Counsellor at Shanghai reports that no detailed regulations have yet been issued for the Weights and Measures Law It is understood however, that invoices should be made out in conformity with the metric system and in order to avoid confusion goods should also be marked according to that system The units to be employed for this purpose are those of the international metric standard and not the Chinese adaptations thereof

EDITORIAL NOTES

The *New York Times* of April 15th, in commenting on the congratulations of Lord Rutherford to Drs Urey, Brickwedde and Murphy on the discovery of double weight hydrogen, expresses appreciation also because of the conspicuous part that Americans have played in physical research during the last two decades

The editorial concludes "In an era when the United States is looked upon abroad as the land of materialism, the place where only the profit-making motive counts, it is good to read Lord Rutherford's words and to realize that not only the spirit of scientific research, but the ability to carry on the work of the great, lies within our laboratories"

Some of the processes of pharmacy may become subjects of research in connection with the important discovery

QUALITY OR QUANTITY?

The *Oil, Paint and Drug Reporter* of April 9th, comments on a recent decision that "Many men will be of many minds with respect to a dictum of a United States Circuit Court of Appeals judge in a recent decision having to do with the regulation of business, for the opinion expressed clashes with many theories and with many views developed beyond the theoretical stage In fact, the judge's utterance is at variance with certain economic delineations set forth in the statutes of the United States and of a number of the States There are those who will find in the dictum disagreement with certain points of the popular conception of constitutional grants of individual rights"

Here is what the appellate jurist said

Surely, it is a mild assumption that the more vital interest in the end may demand that there be less goods sold at higher prices rather than that all existing manufacturers should remain in business He would be a hardy exponent of noninterference who should assert the opposite to day, if for instance the rise in cost was due to improvement in working conditions, or in the hygienic quality of the product

'DRUGGED FOODS"

The *Journal of the American Medical Association* states that "Medicating common food articles with drugs—such as the addition of phenolphthalein to chewing gum, acetylsalicylic acid to candy and senna to bread—is becoming a growing menace, and must be viewed with apprehension and concern as a danger to public health The general appearance of these drugged foods does not distinguish them from the respective non-drugged forms, label declaration of the added drugs cannot be expected to prevent their fortuitous misuse or their consumption by the uninformed, the unobservant or those unable to recognize the significance of label statements There is therefore, the ever-present likelihood that children, and even adults, may unsuspectingly or ignorantly consume such drugged foods with results that may be disastrous"

DEFINITION OF POISON

Dr John J Abel, retiring president of the American Association for the Advancement of Science, in his recent Boston address, said 'there is no definition of a poison in medical law of the United States or England No one has ever been able to give a concise and accurate definition of a poison that would apply to every one of the many thousands of known poisons" Dr Abel made this statement to emphasize how obscure is man's knowledge of poisons and how meaningless is the term in a basic sense 'Nature," he said, "has not affixed a poison label to any particular substance or class of substance The pharmacist does that" Whether a drug is poisonous or not depends on its use or the amount taken

REVISION OF BRITISH PHARMACEUTICAL CODEX

Under the direction of the Council of the Pharmaceutical Society of Great Britain, reports are being issued preliminary to revising sections of the British Pharmaceutical Codex The report of the pharmacy sub committee presents a summary of the principal new or revised formulas recommended by it for inclusion in the British Pharmaceutical Codex of 1934 The sub-committee recommends the inclusion of formulas for a number of preparations from earlier pharmacopœias which are not included in the British Pharmacopœia of 1932 but are still in more or less frequent demand Useful comments on the proposed formulas will be appreciated by the editor, C E Corfield, 17 Bloomsbury Square, London, W C 1, England

PERSONAL AND NEWS ITEMS

Dr Frank A Delgado has been appointed Administration Member of the National Drug Code Authority

Lester E Bishop, of Laurens, S C , has been named associate editor of the *Southeastern Drug Journal* He is president of South Carolina Pharmaceutical Association and member of South Carolina Board of Pharmacy

Dr John J Abel was awarded the Kober medal for 1934 for scientific research; in 1928, he was awarded the gold medal of the London Society of Apothecaries

Our senior ex president John Uri Lloyd celebrated his 85th birthday, April 19th, he has been a member of the ASSOCIATION since 1870, and served as president 1887–1888

Our fellow-member Hugo Kantrowitz celebrated his 80th birthday on April 8th

Prof Charles W Greene, professor of physiology and pharmacology at the University of Missouri, was elected president of the American Physiological Society at the New York meeting

William F Smith, pharmacist in Perth Amboy, N J , and graduate of New Jersey Law School has been appointed special Assistant U S District Attorney for New Jersey

President C Thurston, of the National Association of Boards of Pharmacy, has been commissioned a Colonel by Governor Ruby Lafoon of Kentucky

Prof Gustav Bachman, Minnesota Pharmaceutical Association, has declined reëlection as secretary for the term beginning February 1935, at which time he will be succeeded by A Roy F Johnson, *executive secretary* C V Netz will continue as *acting secretary* until February 1935 He will serve as field secretary during the summer months Professor Bachman sustained serious injuries in an automobile accident some time ago

Wroe Alderson has resigned as assistant chief of the domestic division of the U S Bureau of Foreign and Domestic Commerce He is now director of a Research Bureau New York, organized for research activities for manufacturers, distributors and trade associations

William H Johnson, who has been acting as executive secretary of the National Retail Drug Code Authority since its organization, has resigned that position and has been succeeded by Paul Pearson, Washington, who has taken over Mr Johnson's duties with title of assistant secretary Mr Pearson for twenty-four years has been president of the Washington Wholesale Drug Exchange and is president of the District of Columbia Pharmaceutical Association

D D Adams, after long years of service, has retired as treasurer of Nebraska Pharmaceutical Association

P O Bugge, Bisbee, No Dak , noting the article in the A PH A JOURNAL on Henrik Ibsen referred to his winning a national prize, in 1927, for his poem on Henrik Ibsen, presented in a contest at the time of the Ibsen centennial celebration in Minneapolis

Charles Morgan, of Morgan & Millard, Baltimore, states that while gain in business volume is not large, the trend is toward pharmaceuticals

A PRICE LIST TO BE COMPILED

The Retail Drug Code Authority in conference, on April 18th, acted upon the suggestion that there should be compiled a price list for drug products, which could be used as the official price list in the interpretation of "cost" under Section 6 of the Retail Drug Code These prices are based on the "manufacturer's wholesale list price per dozen ' and will include all discounts, free goods, etc , as defined in the recent amendment to the Retail Drug Code

A preliminary list of 400 items will be compiled, and to this will be added all items essentially necessary for the use of the various code authorities Corrections to the list will be made immediately upon the issuance of any new price list by the manufacturer

PRICE REGULATION FOR RETAIL DRUG TRADE

The National Recovery Administration, on April 19th announced issuance of an order under which a drug retailer may reduce his price to meet the price of a competitor until such time as the National Retail Drug Code Authority, or the Local Authority, shall have announced a price which shall be *prima facie* evidence of the correct price

Upon announcement of this *prima facie* correct price by the Code Authority, the new order provides that reductions below such announced price shall constitute a violation of the code unless the retailer is able to prove that the correct price is lower than that announced by the Code Authority

The new order becomes effective immediately

OBITUARY

FLORIN J AMRHEIN

Florin J Amrhein, Assistant Professor of Chemistry at Massachusetts College of Pharmacy and member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1916, died March 30th He had been in poor health for several months and was to undergo a surgical operation on March 31st The deceased was born in Boston August 3, 1892 the son of John and Catherine (Luzio) Amrhein

Professor Amrhein graduated from the Boston Latin School Boston University, and from Massachusetts College of Pharmacy in 1915, he also studied at Massachusetts Institute of Technology Soon after graduating from the Massachusetts College of Pharmacy he was elected a member of its faculty

Professor Amrhein was *Grand Regent* of Kappa Psi The deceased is survived by his widow, Dr Elizabeth McCarty Amrhein, and a son, Florin Jr to whom sympathy is expressed

The news of Professor Amrhein came as a shock as the writer had been in correspondence with him during the week before his passing a paper by him is printed in the March issue of the JOURNAL In recent years he had been interested in Vitamin D research

H E BENFIELD

Herbert E Benfield, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and pharmacist of Cleveland, Ohio died February 26th following a heart attack At the time of his death Mr Benfield conducted two pharmacies in Cleveland He was active in organization work and highly esteemed by his co workers and patrons The deceased is survived by his widow and a brother C W Benfield, pharmacist of Solon Ohio

EUSTACE H GANE

Eustace H Gane, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1895, died at his home in Montclair, N J, March 23rd, aged 64 years For twenty-five years, prior to establishing the firm of manufacturing chemists of Gane & Ingram, in 1923 he was associated with McKesson & Robbins At the time of his passing Mr Gane was in the midst of plans for further expansion of the business he had founded and successfully conducted Mr Gane was well and favorably known and a frequent contributor to the Scientific Section of the ASSOCIATION, and gave freely of his knowledge to those who came to him for advice He held membership in the Chemist Club and Drug and Chemical Division of New York Board of Trade

HARVEY H ROBINSON

Harvey H Robinson, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, president of the Henry B Gilpin Company, wholesale druggist, Baltimore, died March 30th after a brief illness, aged 62 years

After completing a business course in Baltimore, he entered the employ of Gilpin Longdon & Company as a clerk When the company reorganized as the Henry B Gilpin Company Mr Robinson became treasurer, in 1910 he became vice president and general manager and, in 1916, he was made president

Mr Robinson was interested in civic and social activities, resulting in Boys' Brigade predecessor of the Boy Scouts, he served as chairman of the Baltimore committee on public athletics and community work He was active in the work of the national drug trade bodies and in all movements designed to benefit the trade He served as president of the Baltimore Drug Exchange, as a member of the board of control and as vice president and on various N W D A committees In the work of the latter to formulate and adopt an NRA code, he was one of the foremost workers Mr Robinson held membership in the Masonic bodies, the Baltimore Merchants Club and the Rolling Road Golf Club He is survived by his wife Mrs Edna Sarah Robinson, two daughters Misses Mazie E and Rebekah O Robinson, his mother Mrs Elizabeth A Robinson, a brother, John O Robinson, and a sister, Mrs Walter Lee Simmons

FRANK B STEPHENS

Frank B Stephens, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and a former president of Florida Pharmaceutical Association died at a St Augustine hospital after a brief illness, aged 65 years He was an honor graduate of the University of Chicago and before coming to St Augustine operated three drug stores in Toledo, Ohio

Mr Stephens had been engaged in pharmacy at St Augustine for 28 years and was one of the most active workers in Florida pharmacy He was a member of the Masonic bodies His widow, a brother and a sister survive him

WALTER B SWINDELL

Walter B Swindell, president of the Swindell Brothers Glass Company, died at his home in Baltimore following a heart attack The deceased was born in Baltimore in 1850, and with his father, the late William Swindell founded the glass company of which he was head, in 1869 A brother Charles J B Swindell, a son Walter B Swindell, Jr, and three daughters survive the deceased

DR J F SCHAMBERG

Dr Jay Frank Schamberg, professor of dermatology at the medical school of the University of Pennsylvania, Philadelphia, and widely known as one of the co producers in the United States of synthetic salvarsan during the war when supplies of the product were cut off from Germany, died March 30th at his home in Philadelphia, aged 63 years He was a graduate of the Medical Department of the University of Pennsylvania in 1892 and continued his studies in Europe and then practiced in Philadelphia specializing in dermatology and syphilology With Drs George W Raiziss and Dr John A Kolmer, he succeeded in manufacturing salvarsan, in the United States and the $750,000 profits resulting therefrom were donated to the Research Institute of Cutaneous Medicine Dr Schamberg is survived by his wife and two children

Alfons Adolph, who invented view post cards, died in Passau, Germany March 28th, aged 80 years With a special press he printed the first card in 1879 and it was followed by world wide popularity

SOCIETIES AND COLLEGES

ANNOUNCEMENT BY CHAIRMAN BRADLEY OF THE COMMITTEE ON TRANSPORTATION

The Identification Certificate Privilege has been secured from the various railroad passenger associations for the 1934 meeting in Washington This entitles the members to buy tickets for themselves and dependent members of their families, on certificates sent out by Secretary Kelly, for one and one third fare for the round trip, going and returning by the same route or by diverse routes

The following regulations governing the sale and use of these tickets have been received from the Central Passenger Association and similar regulations apply to the sale and use of tickets from points in the territories of other passenger associations

(*a*) Round trip tickets at one and one-third fare (with minimum of $1) for the round trip, on Identification Certificates good *via* same route in both directions will be sold from the above-mentioned territory from April 28th to May 9th, inclusive and before being honored for return passage, return portions thereof must be validated (in space provided therefor) at Washington D C, or Baltimore Md, by ticket agents dating stamp at the regular ticket offices of the lines over which tickets read into Washington, D C, or Baltimore Md from April 30 1934, to and including thirty days in addition to date of sale and when validated tickets will be good for return leaving on any day within final limit, passenger must however, reach original starting point within transit limit shown on ticket

(*b*) For tickets *via* diverse routes Round-trip tickets will also be sold on the one and one third fare basis, going *via* any authorized route published in one way tariffs, returning *via* any other authorized route published in one way tariffs the round trip fare being computed by using one half of the round-trip fare (that is half of the $1^1/_3$ fare) from starting point to destination applying *via* route used on the going trip, plus one half of the round-trip fare (that is half of the $1^1/_3$ fare) from starting point to destination applying *via* route used on the return trip Return portions of tickets must be validated at destination by ticket agents' dating stamp at regular ticket offices of lines over which tickets read returning from place of meeting to original starting point Return limit 30 days in addition to date of sale selling dates and other conditions to be the same as will apply in connection with tickets issued *via* same route in both directions (Item 'a")

Children of 5 and under 12 years of age when accompanied by parent or guardian will under like conditions be charged one half of the fare for adults

It will be necessary for members, when purchasing round-trip tickets to present and surrender the Identification Certificate issued account of your meeting and to indicate to ticket agents which ticket is desired—namely

(1) One and one-third fare for round trip,

good *via* same route in both directions, final return limit 30 days in addition to date of sale

(2) One and one third fare for round trip, going *via* any authorized route and returning *via* another authorized route, final return limit 30 days in addition to date of sale

PAPERS FOR ALL A PH A SECTIONS AND CONFERENCES

Contributors of papers should send their papers to the Section and Conference Officers promptly If the papers are not ready send in the titles, also abstracts of the papers

Officers of the Sections and Conferences are printed in the March issue of the JOURNAL, pages 278 and 279

Programs of the Sections will be printed in the Official Program

TENTATIVE GENERAL PROGRAM FOR THE EIGHTY-SECOND ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AND RELATED ORGANIZATIONS, HOTEL SHOREHAM, WASHINGTON, D C , MAY 7–12, 1934

All dates included in special fare arrangements with railroads

MAY 6–7

Plant Science Seminar Program and Meeting Rooms to be arranged A field trip will be arranged for Sunday, May 6th

SATURDAY, MAY 5

National Conference on Pharmaceutical Research—Club Room Meetings at 2 00 P M and 8 00 P M

Dinner between afternoon and evening sessions at Hotel Shoreham

SUNDAY, MAY 6

American Council on Pharmaceutical Education—Time and Place to be arranged

MONDAY MAY 7

9 00 A M Council A PH A—Conference Room
9 00 A M N A B P—Main Ball Room
9 00 A M A A C P—Executive Committee—Garbo Room
9 00 A M Teachers' Conferences, A A C P
Chemistry Conference—Club Room
Pharmacy Conference—Grill Room
Materia Medica Conference—Empire Room
Pharmaceutical Economics Conference—Card Room
1 30 P M N A B P—Main Ball Room
1 30 P M A A C P—Club Room
6 00 P M Dinner, N A B P—The Kennedy-Warren
6 00 P M Dinner, A A C P—The Kennedy-Warren
8 00 P M N A B P—West Ball Room
8 00 P M A A C P—Club Room
9 30 P M Reception—(Informal) followed by dancing

TUESDAY, MAY 8

9 00 A M Joint Meeting N A B P and A A C P—West Ball Room
1 30 P M First Session, House of Delegates—West Ball Room
2 30 P M N A B P—West Ball Room
2 30 P M A A C P—Club Room
6 30 P M Banquet, A PH A and Related Organizations—Main Ball Room

WEDNESDAY, MAY 9

10 00 A M Dedication of the American Institute of Pharmacy—at the Building—2215 Constitution Avenue
12 30 P M Luncheon, Recipe Book Committee
2 00 P M First Session, Scientific Section—West Ball Room
2 00 P M First Session, Section on Education and Legislation—Empire Room
2 00 P M First Session, Section on Commercial Interests—Club Room
2 00 P M First Session, Conference of Pharmaceutical Association Secretaries—Card Room
6 00 P M Dinner, Kappa Psi Fraternity
6 00 P M Dinner, Phi Delta Chi Fraternity
6 00 P M Dinner, Rho Chi Fraternity, followed by annual convention
8 00 P M Second Session, House of Delegates—Club Room

THURSDAY, MAY 10

9 00 A M Council A PH A—Conference Room
9 00 A M Second Session, Section on Commercial Interests—Club Room
9 00 A M Second Session, Scientific Section—West Ball Room
9 00 A M First Session, Section on Practical Pharmacy—Empire Room

9 00 A M First Session, Section on Historical Pharmacy—Card Room

9 00 A M First Session, Conference of Law Enforcement Officials—Garbo Room

12 00 M Veteran Druggists' Luncheon

2 00 P M Second General Session, A PH A—West Ball Room This session will be a continuation of the dedication exercises of the American Institute of Pharmacy and will be devoted to a general discussion of future plans and of the work to be carried on in the Institute

6 00 P M Dinner, Lambda Kappa Sigma Sorority—The Kennedy-Warren

8 00 P M Joint Session, Scientific Section and Section on Practical Pharmacy and Dispensing—West Ball Room

8 00 P M Joint Session, Section on Education and Legislation, Conference of Pharmaceutical Law Enforcement Officials and Conference of Pharmaceutical Association Secretaries—Club Room

FRIDAY MAY 11

9 00 A M Third Session, House of Delegates—West Ball Room

2 00 P M Third Session, Scientific Section—West Ball Room

2 00 P M Second Session, Section on Historical Pharmacy—Main Ball Room

2 00 P M Second Session, Section on Practical Pharmacy—Empire Room

2 00 P M Second Session, Section on Education and Legislation—Club Room

2 00 P M Second Session, Conference of Law Enforcement Officials—Garbo Room

2 00 P M Second Session, Conference of Pharmaceutical Association Secretaries—Card Room

5 45 P M Dinner Former Presidents A PH A—The Kennedy-Warren

6 00 P M Special dinners

7 30 P M Final Session House of Delegates—West Ball Room

8 30 P M Final General Session—West Ball Room

10 00 P M Farewell Party

10 00 P M Council A PH A—Conference Room

SATURDAY, MAY 12

9 15 A M Automobile Trip through Washington and to Mt Vernon, Alexandria and Arlington Busses will leave from the Shoreham Hotel

SCIENTIFIC SECTION

The 82nd annual meeting will be held in Washington, D C, during the week of May 7th, and will include the dedication of the new headquarters building The Scientific Section plans to hold several interesting sessions but in order to accomplish this the officers must have your coöperation

Since the Convention date is much earlier than usual, it will be necessary for authors of papers to submit titles and very short abstracts to the secretary promptly in order that the titles may appear in the printed program Authors should indicate whether the papers are to be presented in person or by title and should bear in mind that ten minutes is the time limit for the presentation of a paper

L W ROWE *Secretary*, Scientific Section, c/o Parke, Davis & Co, Detroit, Michigan

F E BIBBINS *Chairman*, Scientific Section

SECTION ON HISTORICAL PHARMACY

The forthcoming meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION will be an occasion of unusual interest because it will be held at *home*, in Washington, May 7th That fact alone will be one of great historical significance to the ASSOCIATION and its friends

This meeting should be one of the best for the Historical Section, and you are invited to present a paper upon some phase of historical pharmacy

Papers that are submitted become permanent records in the archives of the ASSOCIATION

Pictures and photographs greatly enhance the value of papers The stories of men, institutions and associations of pharmacy are always interesting Send us the *titles and abstracts* of your stories at your earliest convenience

We are all making pharmacy history Let's record it

C O LEE, *Secretary*, Purdue University, Lafayette, Ind

Programs of all Sections are developing nicely

PROGRAM, LAW ENFORCEMENT OFFICIALS

1 Call to Order
2 Remarks of Chairman, Robert L Swain
3 Report of Secretary, M N Ford
4 Report of Finance Committee

ADDRESSES

'The Place of the Attorney General in the Legislative and Law Enforcement Program Hon Herbert Levy, of the Maryland Bar"

'Is Pharmaceutical Legislation Best Served by a Pharmacist Member of the Legislature?, Frank C Purdum, Pharmacist Member of the Maryland Legislature and Harry E Bischoff, Pharmacist Member of the New Jersey Legislature"

"The Public Health Council of Kansas and the Value of Its Principles to the Pharmaceutical Program, W Mac Childs, *Secretary*, Kansas Board of Pharmacy'

"The Place of the Control Laboratory in the Enforcement of the Food and Drugs Act, William F Reindollar, Bureau of Chemistry, Maryland State Department of Health"

"Report of Special Committee to Define the Terms, 'Patent Medicine' and 'Proprietary Medicine,' A L I Winne Virginia, *Chairman*"

"The Enforcement of State Poison Laws, George W Mather, *Secretary*, New York Board of Pharmacy"

"Coöperation between Federal and State Officials in the Enforcement of the Food and Drug Acts, W S Frisbis United States Department of Agriculture"

"Informal discussion of enforcement procedure, inspection technic legislative and other matters of special interest to the Conference'

TOPICS FOR ROUND TABLE DISCUSSION, CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

'Is it desirable if so is it possible to form a National Association from the various State Associations with every member of the State Association automatically a member of the National Association without payment of additional membership dues?"

Discussion opened by A L I Winne, secretary Virginia Pharmaceutical Association

"Is a State Drug Code desirable in addition to the National Code?"

Discussion opened by Prescott R Loveland, secretary, N J Pharmaceutical Association

"Since the State Associations have been ignored in the National Drug Code set up, what should be the attitude of the State Associations to Code matters?"

Discussion opened by J Lester Hayman, secretary, West Virginia Pharmaceutical Association

'Can a plan be evolved whereby one membership fee can be made to cover State and National Association dues?"

Discussion opened by R A Turrel, secretary, Michigan State Pharmaceutical Association

The organization of Congressional Districts or County Units"

Discussion opened by J W Slocum secretary, Iowa Pharmaceutical Association

'Is the handling of liquor in drug stores under prohibition repeal on a satisfactory basis? What changes or improvements should be made?"

Discussion opened by F V McCullough secretary, Indiana Pharmaceutical Association

"Is it desirable, if so is it possible to have this Conference submit to each State Association each year some suggestions as to the program with the idea of unifying our efforts toward some definitive objectives, National in scope?"

Discussion opened by W D Adams, secretary, Texas Pharmaceutical Association

Is there a desirability and a possibility of holding joint meetings of the Pharmaceutical Associations with the State Medical and Dental Associations?"

Discussion opened by E F Kelly, secretary, Maryland Pharmaceutical Association

What steps can be taken through Association channels to curb the practise of manufacturers packaging 10¢ sizes of proprietary medicines and cosmetics for distribution through department stores?"

Discussion opened by Roy C Reese, secretary, Kansas Pharmaceutical Association

To what extent can the professional phases of Pharmacy be made a part of our programs?"

Discussion opened by J G Beard secretary, North Carolina Pharmaceutical Association

PROGRAM OF NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH, 1934 MEETING

WASHINGTON D C SATURDAY, MAY 5, HOTEL SHOREHAM

First Session, 2 00 P M

1 Call to Order by Chairman
2 Appointment of Nominating Committee
3 Summary of Year's Activities and Outlook of Conference for the Future by Chairman E N Gathercoal
4 Reports of Officers
  a Report of Secretary
  b Report of Treasurer
  c Report of Executive Committee by Secretary
5 Reports of Standing Committees
  (1) Pharmaceutical Dispensing, W J Husa, *Chairman*
  (2) Manufacturing Pharmacy, L W Rising, *Chairman*
  (3) Medicinal Chemicals George D Beal, *Chairman*
  (4) Pharmacognosy, H W Youngken, *Chairman*
6 Roll Call of Delegates
7 Adjournment for dinner Arrangements will be made for a dinner for the delegates assembled

An address pertinent to the work of the Conference will be delivered

Dinner between afternoon ond evening sessions at Hotel Shoreham Dr Carl Voegtlin, Pharmacology Director of the National Institute of Health, will be the guest speaker

Evening Session, 8 00 P M

8 (5) Pharmacology, J C Munch *Chairman*
  (6) Bacteriology, Immunology and Endocrinology, A R Bliss, *Chairman*
  (7) Physical Chemistry, Arthur Osol *Chairman*
  (8) Educational Methods, A B Lemon, *Chairman*
  (9) Pharmaceutical Economics, P C Olsen, *Chairman*
  (10) Historical Pharmacy, C H LaWall, *Chairman*
9 Reports of Other Special Committees
  (1) Fellowship Award J C Krantz, Jr, *Chairman*
  (2) Publications E N Gathercoal, *Chairman*
  (3) Census of Research J C Munch, *Chairman*
10 General Discussion of the Status of Pharmaceutical Research
11 Election and Installation of Officers
12 Adjournment

ROCKEFELLER INSTITUTE OF PUBLIC HEALTH IN JAPAN

A Rockefeller Institute of Public Health, attached to the Tokyo Imperial University has been arranged for It is expected that the proposed construction of the buildings will take two years A hospital will be built in Kyobashi ku Tokyo, for the actual training of the students, and another local hospital will be built at Tokorozawa, Saitama Prefecture Both of these hospitals will be contributed to the prefectures in which they are located

A D M A CONVENTION

The American Drug Manufacturers' Association held their twenty-third annual meeting, April 17th to 19th inclusive, at the Greenbrier Hotel White Sulphur Springs, W Va An interesting program of the sectional meetings was carried out and several important addresses delivered at the business sessions, one by H J Anslinger Commissioner of Narcotics on Newly Discovered Narcotic Drugs and Their Uses" The speaker at the annual banquet was Mrs Ida Wright Bowman, for many years on the staff of current history lectures for the League for Political Education in New York In past years she has studied international affairs abroad

TEXAS WILL BE WELL REPRESENTED IN WASHINGTON

The Texas Board of Pharmacy will attend the Washington meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in a body Officers of the State Association and other Texas pharmacists will be in the party, an interesting trip has been planned, assembling in Dallas Leaving St Louis the members will arrive at Staunton, Va, visit Monticello and other points in Virginia and arrive in Washington, May 7th Leaving Washington after conclusion of the convention they will go to New York where they will be guests of the National Broadcasting studios for a full program and return by way of Canada to Chicago and visit the Century of Progress

LEGAL AND LEGISLATIVE

THE NEW COST DEFINITION

"Inasmuch as the vast preponderance of drug store products are distributed to small drug retailers who are unable to purchase on a quantity basis but who perform services which are essential to the welfare of those in their communities, and whereas such services cannot adequately be performed through the facilities provided by their competitors, and whereas in some cases sales are made to consumers by such competitors at prices below the lowest cost of purchase normally obtainable for such merchandise by small drug retailers, and whereas in most instances such sales prices are not a true indication of the general level of prices of such competitors and no general benefit to those in the community accompanies the same, but such prices are in fact in the nature of bait offers of merchandise to attract trade

"It is hereby declared unfair trade practice and is prohibited by this code for any drug retailer to sell any drugs, medicines, cosmetics, toilet preparations or drug sundries at a price below the *manufacturer's wholesale list price per dozen*, provided however, that in the case of biological or other of the above mentioned products which are not customarily sold in dozens or gross lots, the Code Authority may fix a comparable unit quantity, and provided further that any discount, free deal or rebate which is made available to all purchases of *dozen lots* or comparable quantities shall be considered as part of the manufacturer's wholesale list price "

NATIONAL RECOVERY ADMINISTRATION BEING TRANSFORMED TO CODE-ENFORCEMENT BODY

The long proposed transformation of the National Recovery Administration from a code-making to a code enforcing agency is definitely under way, but the objectives of using codes to increase employment while protecting labor and consumers remain prominent in NRA activities

Tentative orders issued by Administrator Hugh S Johnson not yet fully in effect completely reorganize the NRA deputizing authority to lesser officials and providing machinery for quick disposal of complaints of violations of codes The administrator will retain a veto power but each of the half dozen divisions of the NRA will be largely autonomous and will have authority to dispose of all matters except those involving policies not definitely settled

Reorganization of the NRA is being conducted by W Averill Harriman, division administrator, temporarily in the capacity of first assistant to the administrator Details of the NRA organization have become so voluminous that it is necessary to perfect an organization not so centered on the administrator personally as it has been to date To this end each division will be made practically autonomous for purposes of code administration each with its own group of legal, labor industrial and consumer advisors

A new litigation division is being carved out of the legal division which will have the responsibility of bringing court actions against violators in cases where the code authorities have not been able to secure compliance with the code —*Oil Paint and Drug Reporter*

FIRMS MUST PAY NRA CODE COSTS OR FORFEIT EAGLE

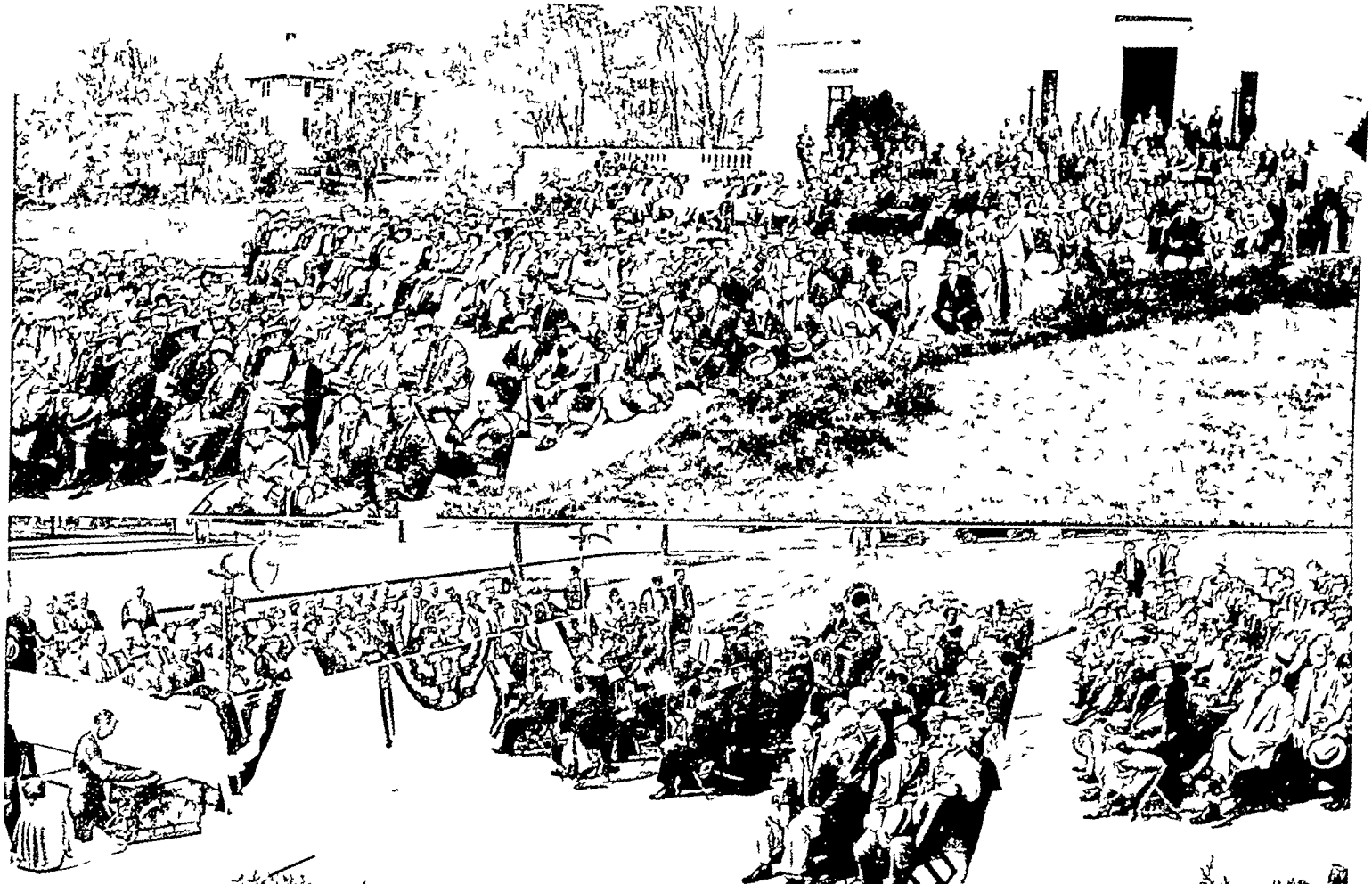
President Roosevelt, on April 14th issued an order under which future display of the Blue Eagle will be allowed only to those firms which contribute to expenses of code administration, wherever such outlays are required

To protect employers from racketeering by organizers of industrial groups, the President required that all Code Authority rates of assessments and budgets of expenditures must be approved by Administrator Hugh S Johnson before any money can be collected

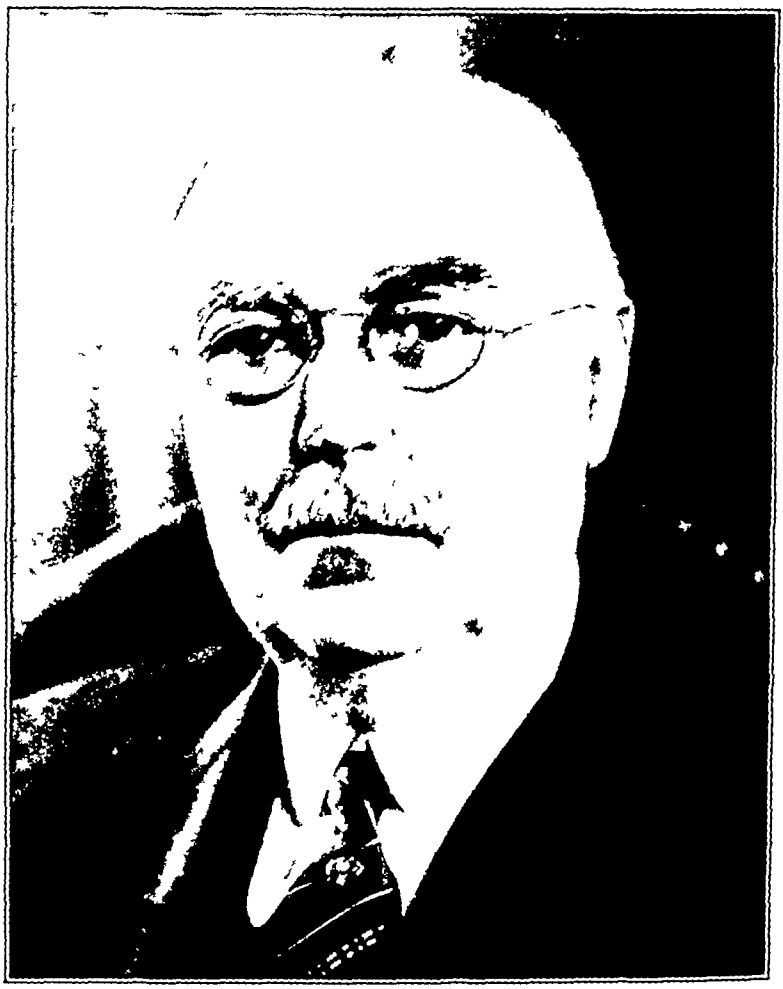
The executive order does not command that every firm under every code pay dues, but substantially leaves this government controlled method of financing administration the only avenue which may be followed

Industries, under the order, will not be required to, but will have the right to apply to NRA for approval of a financing plan, which shall be put into effect if Administrator Johnson "shall find approval by him of such a clause is necessary "

Non payment will constitute violation of the code, subject the firm involved to withdrawal of the Eagle, deprivation of all other code privileges and expose it to suit for collection on the part of the Code Authority



The Dedication Exercises of the American Institute of Pharmacy The half-tone is made in two sections—the speakers stand below on left and the participants in the ceremony continued in upper plate



JOSIAH K LILLY
Honorary President A PH A, 1934–1935

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII MAY 1934 No 5

THE HONORARY PRESIDENT OF THE A PH A, 1934–1935

Josiah K Lilly, elected honorary president of the AMERICAN PHARMACEUTICAL ASSOCIATION at the Washington meeting, became a member of the ASSOCIATION in 1890 He is the son of the founder of the Lilly Laboratories and was born at Greencastle, Ind, in 1861 In 1873 the family moved to Indianapolis

After concluding the studies in the public schools of Indianapolis, Mr Lilly enlisted as a student in Asbury College, now DePauw University, and after that he entered the employ of his father, who had established a pharmaceutical manufacturing plant In 1880 he matriculated at the Philadelphia College of Pharmacy and graduated in 1882 Returning from college he was made superintendent of the laboratories and held this position until the death of his father in 1898, whom he succeeded as president of the company and held this office until January 1932 He is thoughtful of those who cooperate with him and is highly regarded by his coworkers in the industry Mr Lilly takes an active interest in civic affairs and the promotion of endeavors for the betterment of city and state

For many years Mr Lilly has been helpful in the advancement of the work of the Indianapolis Y M C A, of which he served as president and during that time the movement was started for the construction of the present building, he is custodian of a fund of several million dollars, administered for the welfare of the community Higher educational work in Indiana has always interested Mr Lilly and he has made substantial gifts to Butler and DePauw Universities and Wabash College He is a member of the Board of Trustees of Purdue University His interest in the American Institute of Pharmacy is always in evidence

Through his love of music, Mr Lilly has brought to Indianapolis what is understood to be the most comprehensive collection of the poems and songs of Stephen Collins Foster He has built a shrine on his farm near Indianapolis, known as Foster Hall, in which there is a magnificent organ and a repository of a large number of the works and mementoes of the composer

In 1882, Mr Lilly was married to Miss Lily M Ridgely[1] of Lexington They have two sons, Eli, now president of Eli Lilly & Co, and Josiah K, Jr, a vice-president

[1] Deceased April 1934

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

THE AMERICAN PHARMACEUTICAL ASSOCIATION MEETING OF 1934

THE Washington Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION and associated and related organizations was an outstanding success The National Conference on Pharmaceutical Research was well attended and the members were favored by Dr Carl Voegtlin, speaker of the evening Both the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy registered well-represented delegations, general satisfaction of their work was expressed by the members The Joint Session of the latter bodies was addressed by Senator Royal S Copeland on "Food and Drug Legislation," another speaker was President Mordecai Johnson, of Howard University

More than five hundred guests participated in the annual banquet, the interest of which was enhanced by the presentation of the Remington Honor Medal to Sir Henry S Wellcome A report of this function is printed in another section of the JOURNAL and also the addresses of the several presiding officers of the organizations, assembled in convention

The Dedication Exercises were outstanding features of the program of the meeting and are reported in succeeding pages of this issue, and continued in the General Session on Thursday afternoon An intense and lively interest prevailed throughout the discussions which were directed by Chairman H A B Dunning

The House of Delegates, the Conferences of Pharmaceutical Association Secretaries and of the Law Enforcement Officials held profitable and representative sessions, the transactions of these bodies will be reported in a succeeding number of the JOURNAL

All of the sections were well attended and in all of them a large number of timely papers were read and discussed, abstracts of some of these will appear in current issues of the JOURNAL, prior to their publication

The entertainment features received favorable comment, they included dinners, dances, sight-seeing tours in and about Washington, fraternities enjoyed the opportunities afforded by the annual event, the former presidents of the ASSOCIATION dined together and discussed earlier meetings and gave thought to possibilities taking shape with the opening of the American Institute of Pharmacy Their ladies, Mrs H M Whelpley and Mrs John G Godding, graced the table The veteran druggists of many cities joined in the annual get-together feast in a spirit of growing younger, even though time may disagree with them The local committees carried out a successful program with a purpose of impressing Washington hospitality on the visitors

The expression was general that Pharmacy had a building in which pharmacists have pride, beautiful in design and architecture and furnishings Congratulations came from all sections of the United States, Canada and Europe, and representatives, as will be seen from the programs, were cordial in their felicitations and the ASSOCIATION was honored by a message from President Franklin D Roosevelt

The dedication of the American Institute of Pharmacy added lustre to the successful convention, the addresses were timely, and conveyed worth-while and thoughtful messages

The convention of 1934 marks an epoch in pharmaceutical history and progress

---

MESSAGE OF THE A PH A PRESIDENT

THE relatively short ASSOCIATION year, which came to a close on May 11, 1934, was packed with events of utmost importance to American Pharmacy Climaxed by the dedication of the American Institute of Pharmacy on May 9th, the convention of the AMERICAN PHARMACEUTICAL ASSOCIATION and associated and related organizations, held in Washington May 7th to 11th, inclusive, gave evidence of the deep concern with which those who are engaged in the endeavor to preserve and advance the interests of professional pharmacy, are approaching the problems of the day

No reference to the events of the busy convention and dedication week would be complete without a tribute to the high degree of excellence of the addresses given by retiring President Swain on the occasion of the dedication of the American Institute of Pharmacy and at the first general session His recommendations embodied in the presidential address offer a groundwork for constructive effort in the year to come The resolutions growing out of the work and activities of the Sections and Conferences affiliated with the ASSOCIATION will help to guide the immediate activites of the ASSOCIATION in its new location

We have a "long year" ahead of us because of the early date of the Washington Convention The tendency may be to put things off, but we cannot afford to delay action on the activities which American Pharmacy expects to have us prosecute with renewed vigor, because of the inspiration that has come to all of us from the realization of the dream of a permanent institution to house our activities

In the near future committee appointments will be made I hope that no one will accept a committee assignment unless it is with the intention of doing the work that accompanies the assignment It is my further hope that all committees and all who will contribute papers to the next convention will make their plans known to the proper authorities not later than May 1, 1935 There is no good reason why the annual programs of papers and reports should not be printed in full in the JOURNAL at least one month before the convention With your cooperation it can be done

In expressing to the members of the AMERICAN PHARMACEUTICAL ASSOCIATION my appreciation of the high honor which they have conferred upon me in calling me to the presidency, I desire at this time to pledge my loyalty to the principles for which the ASSOCIATION stands and my earnest endeavor to promote the welfare of the ASSOCIATION and its members at all times to the best of my ability I sincerely hope that I may have the whole-hearted cooperation of all who are called upon to serve on committees, delegations and conferences It will be a pleasure to receive communications relating to the welfare of the ASSOCIATION at any time from any member and I assure you that constructive criticism and suggestions will be welcome —ROBERT P FISCHELIS, *President*

SCIENTIFIC SECTION

THE ASSAY OF HYOSCYAMUS *[1]

BY MARVAL D EVANS AND EDWARD D DAVY

The conflicting reports which have made their appearance from time to time as to the proper procedure in the assay of mydriatic drugs, particularly *Hyoscyamus*, led to the study here reported Likewise, results of different analysts did not agree even when the same or a similar method was employed

A few of these differences of opinion are enumerated Watkins and Palkin[2] attribute some of the difficulty to the presence of earthy soaps Stikarofsky[3] suggests that since the alkaloids are sensitive to heat the operator did not observe sufficient caution while evaporating the final solvent Hester and Davy[4] found in *Datura Innoxia* interfering ammonium compounds Goris and Larsonneau[5] found that Belladonna leaves contain volatile bases of alkaloidal and non alkaloidal nature Ewe[6] called attention to these volatile bases in the assay of Hyoscyamus and offers a method for their elimination U S P X cautions against the application of heat in evaporating the solvent to avoid decomposition of the alkaloids

EXPERIMENTAL

Hyoscyamus samples marketed as U S P were purchased with a view to finding a drug that might yield volatile bases other than ammonia when assayed The presence of ammonia was definitely established in *Drug I* Another lot of drug, hereinafter referred to as *Drug II*, was found which yielded volatile, chloroform soluble material in contrast to the former which was water soluble only The work on the crude drug was confined to these two samples

In the results enumerated the U S P X method was followed with modifications of the technique in dealing with the final chloroformic extract

All results reported are expressed in parts per hundred

A U S P X method, with due consideration of the precaution against the application of heat

I (*a*) 0 0433 (*b*) 0 0437 II (*a*) 0 0689 (*b*) 0 0675

B U S P X method modified slightly to determine if volatile alkaline substance was present *Drug I* The final chloroformic extract was evaporated on a water-bath to 5 cc, then to dryness with continued heating with a current of dry

---

* Scientific Section, A PH A, Madison meeting, 1933

[1] Submitted in partial fulfilment of the requirements for the degree of Master of Science at Western Reserve University

[2] H R Watkins and S Palkin *J A O A C* 10 (1927), 130

[3] Albin Stikarofsky, JOUR A PH A, 16 (1927), 30

[4] Earl E Hester and Edward D Davy *Ibid*, 22 (1933), 514

[5] Goris and Larsonneau, *J pharm Belg*, through *Pharm Era*, 54 (1921), 247

[6] George Ewe JOUR A PH A 21 (1932), 870

carbon dioxide and ammonia free air, drawn slowly through the flask the vapors being passed into standard acid The passage of air over the residue and the heat were continued for ten minutes after the chloroform had been completely removed The contents of both flasks were titrated and calculated as alkaloid

I	Alkaloid	(*a*) 0 0306	(*b*) 0 0309
	Volatile material	0 0092	0 0086
	Total	0 0398	0 0395

C The same procedure was followed as in B except that ammonia-free water was used in the flask receiving the vapors instead of standard acid The aqueous solutions of volatile material from two samples were Nesslerized and the presence of ammonia established qualitatively Two additional samples were compared to a standard ammonia The chloroform fraction showed no basic material

		(*a*)	(*b*)		(*c*)	(*d*)
I	Alkaloid	0 0312	0 0296		0 0302	0 0309
	Ammonia qualitative	+	+	(Quant)	0 0081	0 0053
					0 0383	0 0362

The same procedure was followed with *Drug II* except that equal portions of chloroform and water were used in the flask through which the vapors were drawn, as previous qualitative tests showed this drug yield volatile chloroform-soluble material The aqueous portion gave a very slight qualitative test for ammonia when Nesslerized The chloroform portion was titratable

		(*a*)	(*b*)
II	Alkaloid	0 0374	0 0364
	Volatile chloroform soluble	0 0161	0 0185
	Total	0 0535	0 0549

The recovery of the volatile material was probably incomplete in both of these cases but the presence of ammonia in *Drug I* and chloroform-soluble material in *Drug II* was established

D U S P X method except that

1 *Standard acid was added to the last 5 cc of chloroform extract after which the chloroform* was evaporated on the water bath Volatile bases present as ammonia or amines are titrated as alkaloid since these are not volatilized appreciably until the chloroform is completely evaporated

I (*a*) 0 0509 (*b*) 0 0489 II (*a*) 0 0732

2 After titration of the samples above (D 1) each was made alkaline and reëxtracted with chloroform the chloroform evaporated to dryness and the residual alkaloidal material heated at water bath temperature for fifteen minutes to eliminate volatile bases

I (*a*) 0 0301 (*b*) 0 0290 II (*a*) 0 0352

These results compare favorably with those obtained in C where the heat of the water bath was applied

3 In order to determine whether ammonium compounds are formed during the assay each of the samples above (D 2) was made alkaline with ammonia and reëxtracted with chloro

form Standard acid was then added to the last 5 cc of chloroformic extract In event ammonium compounds soluble in chloroform are produced during the assay the values of *Drug I* should show a corresponding increase due to reforming the ammonium compounds when heat is not applied to the dry residue *Drug II* which yielded volatile chloroform soluble basic material should show no increase since it was eliminated when heated in (D 2) That is precisely what happened as shown by the results

I (*a*) 0 0405 (*b*) 0 0381 II (*a*) 0 0352

As a final check on the stability of the alkaloids of Hyoscyamus at water-bath temperature, two samples of *Drug II* were assayed by allowing the final chloroformic extract to evaporate to dryness, and the alkaloidal residue heated for ten minutes on the water bath, during which time two successive portions of 3 cc each of chloroform were added to the residue of each sample and evaporated The alkaloids were determined volumetrically

(*a*) 0 0370 (*b*) 0 0350

The titrated samples were made alkaline and reëxtracted with chloroform and the same procedure repeated

(*a*) 0 0370 (*b*) 0 0370

This offers added proof that heat applied for short intervals at full water-bath temperature causes no loss of alkaloids

BRITISH PHARMACOPŒIA

While the work previously reported was in progress the Sixth Revision of the British Pharmacopœia became available Accordingly two samples of *Drug I* were run by the British Pharmacopœial method with the following results

(*a*) 0 0303 (*b*) 0 0296

The chief objection to the method is the direction to reduce the aqueous solution *in vacuo* This is attended with considerable bumping and the transfer of liquid from the flask may occasion some loss On other occasions not recorded here we have used the ether-alcohol solvent in the initial extraction and find this a distinct improvement in the elimination of emulsions which are sometimes encountered with chloroform-ether solvent

MIXTURE OF ALKALOIDS

		Original No Heat Applied	Extracted Alkaloid Heated 15 Minutes
d-Hyoscyamine		0 0312	0 0318
l-Hyoscyamine		0 0300	0 0318
l Scopolamine	(*a*)	0 0286	0 0284
	(*b*)	0 0248	0 0246
Atropine	(*a*)	0 0243	0 0244
	(*b*)	0 0245	0 0242
Mixture calculated to hyoscyamine		0 0731	0 0729

The residual solutions after titration were tested for chlorides with negative results

EFFECT OF HEAT ON THE MYDRIATIC ALKALOIDS APPROXIMATING THE CONDITIONS ENCOUNTERED IN THE ASSAY OF THE CRUDE DRUG

Samples of pure *d*- and *l*-hyoscyamine hydrobromide, *l*-scopolamine and atropine sulphate were dissolved separately in water, ammonia added, and the alkaloids extracted with chloroform The chloroform was evaporated to 5 cc , standard acid added and the solution titrated after the chloroform had been removed by evaporation After titration each sample was made alkaline with ammonia and reëxtracted with chloroform The chloroform was completely evaporated at water-bath temperature and the residue heated for five minutes Three cc of chloroform were added to redissolve the residue, and the heating continued for ten minutes after the evaporation of the chloroform A mixture of these alkaloids was then made and the same procedure applied The results are given in the foregoing table

CONCLUSIONS

1 The present official and proposed methods of assaying Hyoscyamus do not give concordant results

2 The varying results obtained by chemists are due to volatile bases originally present, or formed during the assay, and extracted with the alkaloid, giving unusually high results

3 Evidence was found to substantiate both the ammonia and amine contentions and proof is given, within reasonable limits of experimental error, that the alkaloids of Hyoscyamus are not affected by exposure to the heat of the water-bath for fifteen minutes

4 It is recommended that the alkaloidal residue be heated for fifteen minutes at water-bath temperature, adding two successive portions of five cc of chloroform during the heating

---

THE ASSAY OF HYOSCYAMUS

BY H G DEKAY AND C B JORDAN

(*Continued from April Journal, page 322*)

III COLLABORATION WORK

Samples of the Hyoscyamus which we used in our experiments were submitted to a number of collaborators They were asked to perform the following assays

1 Hot Extraction Process (*6*)—Place 25 Gm of Hyoscyamus in No 60 powder in a thimble transfer to a Soxhlet apparatus and moisten with a mixture of 8 cc of stronger ammonia water, 10 cc of alcohol and 20 cc of ether, mix thoroughly, and macerate over night Extract for 3 or 4 hours on a water bath using ether as a solvent evaporate the extract to about 15 cc and then add 10 cc of approximately *N*/10 sulphuric acid and 10 cc of water and continue the evaporation until the ether is removed Filter into a 100-cc graduated flask, dissolve the chlorophyll residue in chloroform, add acidulated water and evaporate until the chloroform is removed then filter through the same filter into the graduated flask and make up to volume Make basic with ammonia T S and extract the alkaloids by shaking out with chloroform Test for complete extraction Evaporate or distil the chloroform to low volume, then to dryness on a water bath and keep at this temperature for 15 minutes Dissolve the residue in chloroform, evaporate to dryness on a water-bath and continue heating for 15 minutes Repeat this for the third time Take up the final residue in chloroform add 10 cc of *N*/50th acid remove the chloroform by evaporation and titrate the excess acid with *N*/50th base using methyl red as an indicator

2 Method 2—This was the U S P X process with the following modifications The

extractive was subjected to the purification process suggested The final chloroform extract was subjected to the same heating process as given in foregoing

The following results were obtained (7)

Worker		Method 1	Method 2
1		0 0406%	0 0409%
2		0 0462%	0 0673%
3	A	0 0452%	0 0272%
	B	0 0455%	0 024 %
4	A	0 051 %	0 0505%
	B	0 0517%	0 047 %
5	A	0 0416%	0 0576%
	B	0 0393%	0 052 %
6	A	0 047 %	0 0867%
	B	0 041 %	0 0717%
7	A	0 046 %	0 032 %
	B	0 044 %	0 031 %
	Average	0 0445%	0 0452%

The letters A and B designated two different assays of the drug sent a month apart

Method 1 has been recommended for consideration to the Sub committee on Crude Drug Assay of the U S P Revision Committee

From the results of these experiments we have come to the following conclu sions *1* That there is a volatile basic constituent obtained in the assay proc esses and *this gives the isonitrile test, 2*, the present U S P X process probably does not extract much of this basic constituent, *3*, if stronger ammonia water is used in this process, the basic constituent is extracted and the results are high, *4*, the process recommended by J J Durrett gives results too high because it ex tracts these volatile bases, *5*, the Watkins and Palkin purification process has decided advantages in securing sharp end-points in titration

IV TO DETERMINE BASIC CONSTITUENT

The problem now confronting us was the separation and identification of the volatile basic constituent or constituents which were evidently the cause of the discrepancies in the results of the assay processes as given on page 2 and the varia tion of results during our experiments

In order to obtain the volatile material, warm dry air was passed over the residues obtained upon the evaporation of the final chloroform extraction and passed through a weak acid solution A special drying apparatus was arranged in which the air was dried by passing it through a wash bottle of sulphuric acid, then through a calcium chloride and soda lime tower and then through a "U" tube which was heated by the water-bath The warm dry air was passed over the chloroform residue contained in a flask, which was heated at water-bath tempera ture, and then passed through a dilute hydrochloric acid solution Blank deter minations were made to test the apparatus A number of experiments were then made as follows

Experiment 1 A 50 Gm sample of drug was placed in a thimble in a Soxhlet apparatus macerated and extracted according to the method on page 391 The extract was purified and filtered into a 100 cc volumetric flask and then divided into two aliquot parts (A and B) These were made basic with ammonia water, shaken out with chloroform and the assay completed

The purpose of this experiment was to test the personal factor of the operator Percentages are expressed in terms of alkaloids

Sample	(A)	(B)
1	0 1225%	0 1217%
2	0 1366%	0 1326%
3	0 1272%	0 125 %

The personal factor can be disregarded

Experiment 2 50 Gm samples of the drug were extracted as in Experiment 1 and the extract was divided into two aliquot parts (A) was assayed in the usual manner, and (B) was made basic and extracted with chloroform which was evaporated to about 2 cc and placed in the drying apparatus with the temperature controlled at 40° C and the drying continued for 1 hour, the air being passed through a standard acid solution The final residue was taken up in chloro form, standard acid added, chloroform removed by evaporation and the assay completed Percentages are in terms of alkaloids

Sample	(A)	(B) Dried Residue	(B) Volatile Portion
1	0 1274%	0 0901%	0 0241%
2	0 1352%	0 0836%	0 0433%

The above results clearly indicate a volatile base

Experiment 3 Experiment 2 was repeated and the final chloroform residue dried at 60° C over a period of 1 hour Percentages are in terms of alkaloids

Sample	(A)	(B) Dried Residue	(B) Volatile Portion
1	0 1352%	0 0665%	0 0125%
2	0 146 %	0 0557%	0 0566%

In order to secure larger quantities of volatile basic material it was necessary to prepare a large Soxhlet apparatus which would extract 400 to 500 Gm of drug A large percolator was fixed so that a continuous extraction could be made A number of samples were assayed according to the hot extraction process and the final chloroform residues dried in the apparatus and the volatile material collected in dilute hydrochloric acid

The hydrochloric acid solution was evaporated to dryness and a small amount of amorphous white powder-like material was obtained having a fishy odor and giving an isonitrile reaction for primary amines It was necessary to combine several fractions before a sufficient quantity of the material for qualitative investigations was obtained

The following investigations were made *1* An organic analysis showed the presence of carbon, hydrogen, nitrogen and chlorine, the last being due, it is assumed, to the hydrochloric acid used, *2*, the white powder gave no definite melting point and the variations of the melting point led us to believe that this was a mixture The material was made basic, extracted with chloroform and the chloroform removed below 0° C A small amount of a volatile liquid was obtained which possessed a strong fishy odor, was basic to litmus and volatilized between 3° and 7° C *3* The qualitative separation for mixtures of amines given by Kamm (10) was used A tertiary amine fraction was obtained whose hydrochloride changed at 185° C and then decomposed at 271–275° A chloroplatinate was made and after recrystallization it decomposed at 240–245° C The result of these determinations led us to classify this material as trimethylamine *4* Attempts were now made to recrystallize the amorphous material from dilute hydro

chloric acid and two types of material resulted, one a silky, needle-like crystal, and the other an amorphous mass The needle-like crystals were carefully collected by mechanical separation and they gave a sharp melting point of 171° C These crystals were made basic and extracted with chloroform, after which they were evaporated below 0° and we again obtained a small amount of liquid having a fishy odor, basic to litmus and volatilizing between 3° and 7° C We believe that this compound is dimethylamine

A further investigation of the presence of bases in the crude drug was made as follows 500 Gm of drug were macerated over night with 1/2 to 1% NaOH solution, then steam distilled and four liters of distillate were collected in dilute hydrochloric acid The distillate was evaporated to a syrupy consistency It became dark brown in color and gave the characteristic odor of the drug The syrupy residue was diluted with distilled water and clarified by the use of charcoal It was then evaporated to dryness and a copious white precipitate was obtained

The precipitate showed the presence of chloride and ammonia and gave an isonitrile reaction Any basic material present was separated from ammonium chloride by extraction with hot absolute alcohol About 0 1 Gm of alcohol-soluble material was obtained The alcohol-insoluble material did not respond to the isonitrile test Further tests proved this to be ammonium chloride The alcohol soluble residue was again treated with hot alcohol in hopes to make a further separation, by fractional precipitation, and a small amount of material was obtained which *gave the isonitrile test* Melting-point determinations were made which were variable showing a slight change at 170°, again at 185° and apparent decomposition at 265° A chloroplatinate was prepared which was apparently only one substance as examined under the microscope This derivative decomposed at 236–242° The remainder of the base was dissolved in water, made basic with ammonia T S and extracted with chloroform which was removed in the cold A small amount of a viscous liquid was obtained which possessed a fishy odor and volatilized at 3° to 7° C , again leading us to believe that trimethylamine was present

Since the W & P extraction process (macerating over night with stronger ammonia water followed by hot extraction) gave much higher yields of basic material than were secured in the U S P X method and since a mixture of amines was obtained in these residues, we were led to believe that these amines might be due to decomposition of some basic material during the assay process The presence of trimethylamine is not uncommon in those plants containing choline as a constituent According to Kunz (8), Tschirch (9) and Pictet and Biddle (11), choline has been found in *Hyoscyamus niger* We tested the drug for the presence of choline by the process outlined by Kunz (8) for the isolation of choline from extracts of Belladonna

We isolated a product, by this procedure, which gave the following reactions A precipitate was obtained with Mayer's reagent which melted at 110° A chloroplatinate was prepared which decomposed at 240–242° C The material was treated with moist silver oxide and a distinct trimethylamine odor was obtained These same tests were performed upon known choline hydrochloride obtained from Eastman Kodak Company and the results checked those which we had obtained upon our product We therefore believe that this verifies the presence of choline in *Hyoscyamus niger* as reported by Kunz and others

The decomposition products of choline are usually given as trimethylamine and glycol This led us to treat known choline hydrochloride by the hot extraction process given previously The final chloroformic extract was divided into two equal parts The first was evaporated to about 2 cc , placed in the drying apparatus and warm dry air passed over it for an hour, and the air passed through a weak hydrochloric acid solution This hydrochloric acid solution gave tests for trimethylamine and a faint isonitrile reaction The second portion was evaporated to low volume, standard acid added, chloroform removed by evaporation and excess acid titrated using $N/50$ NaOH A basic material was definitely indicated

SUMMARY AND CONCLUSIONS

1 The alkaloids of Hyoscyamus are much more stable than they are usually assumed to be When chloroform solutions of them are evaporated they can be heated at the temperature of the water-bath one or two hours without decomposition

2 The hot extraction process recommended to the Revision Committee gives much too high results because of the fact that volatile bases other than alkaloids are extracted and assayed as alkaloids In a smaller measure the same is true with the U S P X process

3 The presence of choline in Hyoscyamus has been reaffirmed

4 The discrepancy between the results of the hot extraction process and the U S P X process of assay is presumably explained by the fact that the former because of the presence of stronger ammonia water and heat decomposes more of the plant choline

5 Trimethylamine and a primary amine were found in the residues secured by the hot extraction process

6 Indications of the presence of dimethyl were obtained but not confirmed

7 Any assay process for Hyoscyamus must take into consideration the elimination of volatile bases, other than alkaloids, that may be extracted

We recommend the following assay process

Place 25 Gm of Hyoscyamus in No 60 powder in a thimble, place the thimble in a Soxhlet extractor and moisten with a mixture of 8 cc of stronger ammonia water, 10 cc of alcohol and 20 cc of ether, mix thoroughly, macerate over night, then extract for not less than 3 hours on a water-bath using ether as a solvent Evaporate the extractive to about 15 cc and then add 10 cc of approximately $N/10$ sulphuric acid and 10 cc of water Continue the evaporation until the ether is removed Filter into a separatory funnel, dissolve the chlorophyll residue in chloroform, add acidulated water and evaporate until the chloroform is removed and filter into the funnel through the same filter paper Make the filtrate basic with ammonia T S and extract the alkaloids by "shaking out" with chloroform Test for complete extraction of alkaloids Evaporate or distil the chloroform to low volume, then evaporate to dryness on a water-bath and keep at this temperature for 15 minutes Dissolve the residue in chloroform, evaporate to dryness on the water-bath and continue the heating for 15 minutes Repeat this for the third time Take up the residue in chloroform, add 15 cc of fiftieth normal sulphuric acid, remove the chloroform by evaporation and titrate the excess acid with fiftieth normal base using methyl red as indicator

REFERENCES

(1) Watkins and Palkin, Jour A Ph A , 16 (1927), 1039
(2) U S P XI Revision Bulletins, Sub committee No 6, Assay Bulletin 12 page 28
(3) U S P XI Revision Bulletins Sub committee No 6, Assay Bulletin 16, pages 48-49
(4) U S P XI Revision Bulletins Sub committee No 6, Assay Bulletin 24 pages 86-90
(5) Schou and Bjerregaard *Dansk Tids Farm* 6 185–193, through *C A* , 27 (1933) 5145
(6) Sub committee No 6 Assay Bulletin 41, pages 153–170
(7) Sub committee No 6, Assay Bulletin 45 pages 176–181
(8) Kunz, *Arch fur Pharm* 223 (1885) 701–709
(9) Tschirch Handbuch der Pharmacognosie," Band 3 Ab 1 page 291
(10) Kamm Qualitative Organic Analysis "
(11) Pictet and Biddle The Plant Alkaloids "

ISOLATION AND IDENTIFICATION OF SUCROSE FROM SENEGA *[1]

BY RALPH BIENFANG

As early as 1836, Price made mention of a sugar-like substance which he noticed in an extract of senega In 1894 Guillaume-Gentil reported that he obtained a carbohydrate, polygalite, using a method projected by Chodat in obtaining it from the root of Polygala amara Characters for this substance given by Guillaume-Gentil were, melting point 138°, easily soluble in water, hot alcohol and practically insoluble in ether Fehling's solution had no immediate effect upon an aqueous solution of it, but after 24 hours, a red sediment was noticed in the bottom of the tube In 1896, Schroeder in this country reported the presence of 5 82% of sucrose, and in 1896 Kain in Germany likewise reported sucrose as a constituent of senega

Seven Kg of senega in a No 20 powder were first extracted with petroleum ether and then with alcohol The alcoholic extracts were turbid, and so were filtered before being concentrated The concentrated alcoholic extract was put into glass containers and allowed to stand at room temperature for two weeks At the end of this time an appreciable crystalline deposit had formed on the sides and bottoms of the containers This was broken up, filtered out, redissolved in diluted alcohol, and shaken with animal charcoal until a colorless syrup was obtained In this syrup, upon standing, crystalline blocks were formed These crystals obtained were sweet and so some of the material was tested with the Molisch reagent for carbohydrates The result was positive With Fehling's solution a negative result was obtained The crystals were soluble in water and hot alcohol, but insoluble in cold alcohol and ether The melting point was found to be 186–187° C , specific gravity 1 5734 at 20° C A specific rotation of +67 5° became −20 4° after boiling with HCl An acetate was attempted with the production of a bitter syrup insoluble in water but soluble in alcohol Glucosazone was formed when it was heated for 46 minutes with phenylhydrazine hydrochloride and sodium acetate

* Scientific Section, A Ph A Madison meeting, 1933

[1] From a thesis submitted in partial fulfilment of the requirements for the Ph D degree University of Wisconsin, 1929

Since the above characters of the isolated material agree with those recorded for sucrose, the material was concluded to be sucrose

BIBLIOGRAPHY

R Price *Am J Pharm*, 8 (1836) 92
B Guillaume Gentil *Schweiz Wochenschr Chem Pharm* 32 (1894), 340
J H Schroeder, *Am J Pharm*, 68 (1896) 178
J Kam *Pharm Post*, 31 (1898) 61 73 81, 93, 105, 329 341

PSYLLIUM SEED II SO-CALLED "ADEX PSYLLIUM"*

BY HEBER W YOUNGKEN

In a previous article (see JOUR A PH A, 21 (1932), 1265–1271), some studies were reported that had been made by the author on commercial Psyllium seeds Since that time he has examined many commercial samples of Psyllium including the article known as "Adex Psyllium"

Psyllium seed has become a broad commercial synonym for a variety of seeds belonging to the genus *Plantago*, many reputable dealers specifying on their labels the particular commercial variety of Psyllium by limiting adjectives preceding the noun, such as French-, Blonde-, White-, Brown-, Black-, German-, Spanish-, and some have supplemented the common commercial name with the scientific or botanical name of the plant claimed to yield the product

During the course of the author's earlier observations on the commercial Psylliums, he came upon a package labeled 'Adex Psyllium Seed" Upon examination of its contents it proved to consist of the nutlets or fruits of a Labiate, and this product was being offered as a kind of Psyllium seed Later, he received samples of this very article by two dealers who sought his opinion on the quality of "this form of Psyllium seed"

Of course it was not a Psyllium seed at all, not even a seed, but a fruit of the Labiate which Clevenger had previously detected and reported to be yielded by *Lallemantia royleana* (1)

The plant was named after the botanist, Royle, who collected it in the province of Kanaor in India

The author planted several lots of these small fruits in seed boxes and pots and reared several plants therefrom which he compared with the description of *Lallemantia Royleana* Benth in De Candolle s *Prodromus* (2) and found the characteristics of them to tally with the statements on this species in that authoritative work

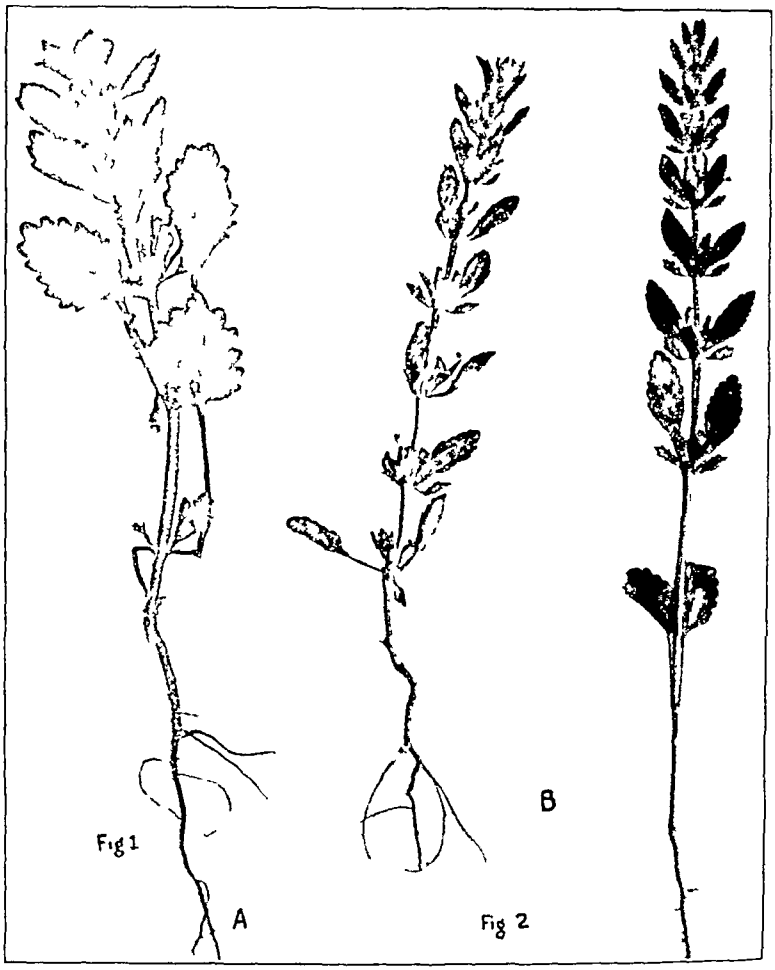
DESCRIPTION OF LALLEMANTIA ROYLEANA BENTHAM

An annual herb native to India and Persia attaining a height of from 5 to 18 inches Stem quadrangular simple to branched glabrate at base softly villose beyond and pubescent at the apex Foliage leaves opposite ± cordate below petiolate, green base of the lower cuneate, of the upper narrowed into petiole margin of lower leaves crenate inflorescence a long interrupted spike like raceme of verticillasters bracts small petiolate flowers small tubular bilabiate the calyx green pubescent 5 toothed and striate the corolla pale purple to blue with a slender tube and a 2 lipped limb fruits 4 dull black oblong ovate nutlets, seed exalbuminous

---

* Scientific Section, Madison meeting, August 1933

Plants grown by the writer from commercial "seed" were in flower in late July They varied from 12 to 30 cm in height The foliage leaves were petiolate, the lower up to 4 cm in length, the lamina cordate, up to 2 cm long and 1 cm broad, the apex obtuse, the base cuneate, margin crenate and surface villose The upper foliage leaves were oblong-ovate, spatulate to lanceolate with mucronate



Figs 1 and 2—Flowering plants of *Lallemantia Royleana* Benth grown from two lots of so called "Adex Psyllium seed "

apex, attenuate base and dentate to serrate margin The bracts were oblong, sharply serrated, the teeth terminating in long, lilac-colored bristles The flowers were tubular-bilabiate, each with a green, slender, tubular calyx 5 to 6 mm long, possessing 15 villose ribs and a lilac to purplish blue, tubular bilabiate corolla

PHYSICAL CHARACTERISTICS OF FRUITS

When examined under a lens the nutlets are oblong ovate dull black to dark brown (immature fruit) with a light brown edge when examined over a surface illuminated from below with a dorsal convex surface and two plane or slightly concave ventral surfaces, the latter sepa

rated by a longitudinal ridge which extends to a cream-colored, elevated, saddle shaped hilum at the narrow end, 3 to 3 5 mm long and 1 to 1 2 mm wide, internally the cut surface showing a narrow black pericarp and a large gray to bluish gray oily seed, odor indistinct, taste sweet and mucilaginous upon mastication

HISTOLOGY OF FRUITS

Cross and surface sections were cut in cork and paraffin and separately examined in water, iodine water phloroglucin-HCl, picric acid and in xylol mounts under a compound microscope A cross section cut through the middle region of the fruit exhibits an irregular, triangular outline with rounded angles, one convex side and two more or less concave sides

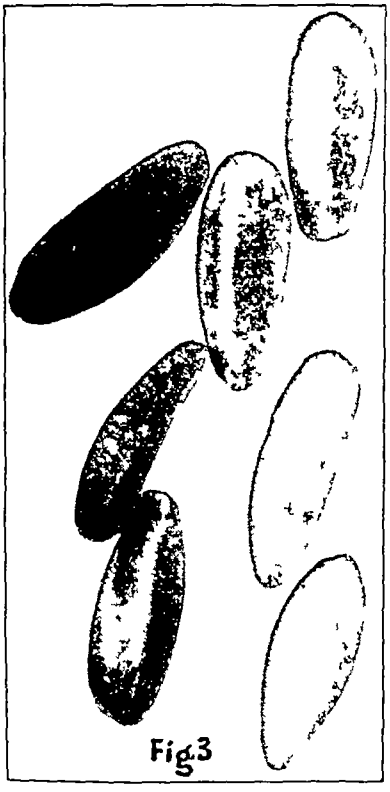


Fig 3 —Fruits of *Lallemantia Royleana* offered on the American market as 'Adex Psyllium" and more recently as a ' Black Plantago Psyllium seed " Photomicrograph × 10

Pericarp —This consists of an epidermis and a brownish black pigment layer The epidermis is mucilaginous, from 21 24 to 32 microns in radial breadth its cells showing prominent thick radial walls outer walls which are thin in the middle and thickened toward the radial walls and thin, inner walls Many of the outer walls appeared missing The radial walls of adjacent cells terminate in shal low saucer or cup shaped structures which give them the appearance of long stemmed goblets or peltate structures The lumina of these epidermal cells are filled with cell content mucilage

When mounts of dry cross sections are irrigated with water, the outer walls of the epidermal cells burst and long laminated finger like processes of mucilage quickly protrude The mucilaginous processes extend from the inner wall of each of the epidermal cells and project outward between the jagged cup like ends of the radial walls for a considerable distance beyond the margin of the section The pigment layer contains dark brown amorphous matter

Seed —Beneath the pericarp and adhering thereto is the seed coat which is composed of outer brown, narrow, palisade cells and inner brown, irregular to stellate cells the latter having long slender processes

The embryo consisting of 2 large fleshy cotyledons and a hypocotyl fills up the large central part of the seed Its small parenchyma cells possess thin walls and contain minute aleurone grains and fixed oil droplets, but no starch

BEHAVIOR OF ENTIRE FRUITS IN WATER

When 1 Gm of the entire fruits was placed in a 50-cc graduated cylinder, water added to the 50-cc mark and the contents agitated at intervals during 24 hours, at the expiration of which time the total volume occupied by the swollen fruits was noted, the final reading showed the swollen fruits occupied a volume up to the 40 cc mark In 48 hours the volume occupied was 47 cc The fruits, enveloped in mucilage, tended to cohere

When entire dried fruits are examined in water under the compound microscope, the epidermis swells, the outer walls burst, liberating numerous finger-like processes of mucilage which later coalesce, forming a bluish tinged mucilage which tends to adhere tenaciously to the fruits Within 24 hours after a fruit has been

macerating in water, the mucilaginous exudate adherent on its outer surface occupied an area of at least six times that of the fruit included within it As noted above in the sections, so also in the entire fruit, the radial walls of the epidermal cells appeared as long-stemmed goblets whose terminal cups frequently showed jagged margins The mucilage at the end of this period appeared as irregular, interrupted, radiating strings

Recently the writer has been informed by a friend at Collegeville, Pa , of a serious case of illness following ingestion of a drug answering the description of this one From the tendency of the fruits to cohere, and from the microscopical studies of the outer fruit wall after maceration in water, as aforementioned, it

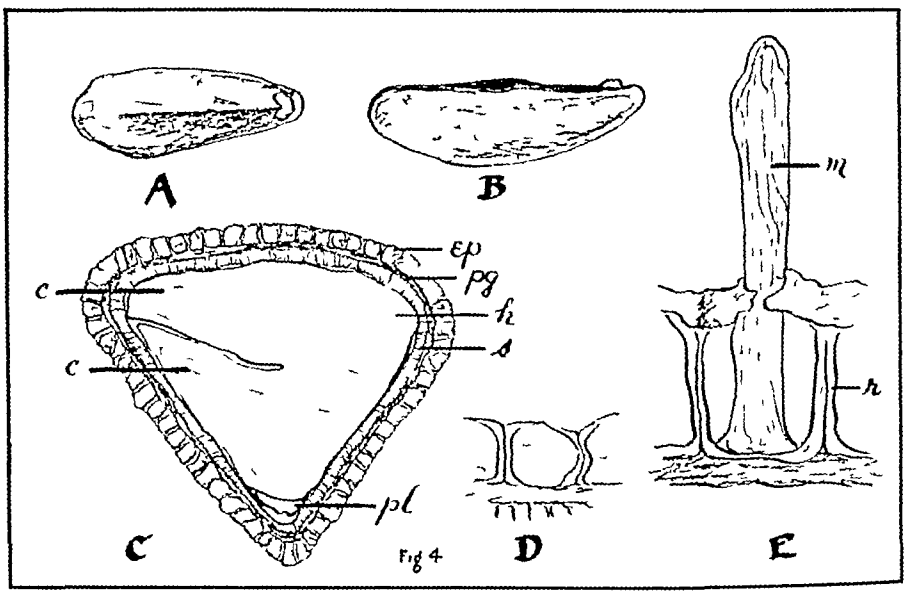


Fig 4

Fig 4 —Fruit of *Lallemantia Royleana*, commercially known as *Adex Psyllium* A, ventral surfaces B, dorsal convex surface and portion of one of the ventral sides C transverse section, showing epidermis (*ep*) and pigment layer (*pg*) of pericarp, seed coat (*s*) cotyledons (*c*) and hypocotyl (*h*) of embryo, and placenta (*pl*) D, a more magnified view of a portion of the epidermis and subjacent tissue in cross section of dry fruit Note mucilage in epidermal cell and radial walls with middle lamellæ E, view of the outer portion of the cross section of the fruit directly after irrigation of mount with water *m* mucilage, *r*, peltate structure formed of radial and outer walls of adjacent epidermal cells

is conceivable how such could follow When taken into the intestine, it is probable that intestinal movements caused formation of a bezoar mass with the rigid, peltate projections of epidermis of the fruits interlocked, occluding the passageway

CONCLUSION

While mucilage of fruits of *Lallemantia Royleana* may be found of some service in the arts, if means for properly separating it can be devised, the writer is of the opinion that the internal administration of this fruit to man or beast is dangerous

BIBLIOGRAPHY

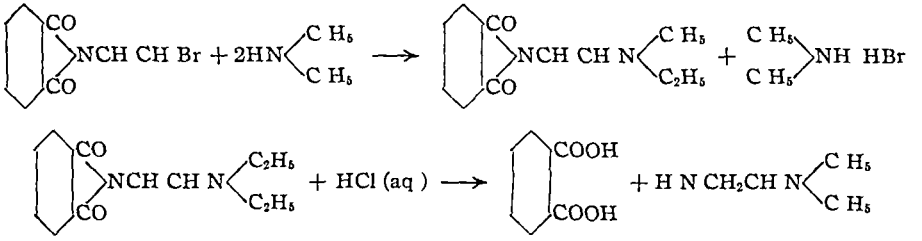
(1) J F Clevenger *Drug Markets*, 29 (1931) 236
(2) A De Candolle *Prodromus Syst Natur Regni Veg* 12 (1848), 404

Massachusetts College of Pharmacy August 15 1933

A CONVENIENT LABORATORY METHOD FOR THE PREPARATION OF UNSYMMETRICAL DIETHYL ETHYLENE DIAMINE *

BY W A LOTT AND W G CHRISTIANSEN

The following is a detailed description of a modification of the method described by Ristenpart for the preparation of unsymmetrical diethyl ethylene diamine, it gives good results and is very convenient



Procedure —One hundred and twenty-three Gm of bromethylphthalimide is boiled under a reflux condenser for 12 hours with 70 Gm diethylamine dissolved in 300 cc dry toluene After the first 3 hours' boiling, the diethylamine hydrobromide is removed by filtration before continuing (*Note 1*) After removing the remainder of the diethylamine hydrobromide by filtration, the reflux condenser is replaced by a condenser arranged for downward delivery, and the toluene is removed by distillation The reflux condenser is now returned into place and the residue is boiled for 3 hours with 420 cc of 20% HCl Upon cooling, the phthalic acid is filtered off and leached with warm (not hot) water to recover any product retained by it The solution of the diamine hydrochloride is concentrated in an open dish on the steam-bath until it is a thick, viscous syrup and with good external cooling, the syrup is made strongly alkaline by means of 40% KOH Now 25 cc isopropyl alcohol is added, and then an excess of solid KOH, in small pellets, which causes the appearance of a copious precipitate of potassium chloride The reaction mixture is allowed to settle out in a tall narrow cylinder or centrifuged The isopropyl alcohol solution of the amine is dried carefully over solid KOH and subjected to distillation

Thirty-two Gm or 61% of material boiling at 143–147° C is obtained (*Note 2*) The pure material boils at 145° C

Note —1 About 84% of the theoretical diethylamine hydrobromide is removable after 3 hours About 14% additional is removable after 10 hours, and most of the remaining 2% is removable after 12 hours

2 Practically all of the loss of yield is mechanical loss in separating the amine solution from the KCl and strong potash Further extractions with isopropyl alcohol can be made, but the main product should not be dissolved in a larger volume of alcohol than that specified since much amine boils over with the alcohol, making rectification difficult

Other Methods of Preparation —Ristenpart (*Ber*, 29 (1907), 2526) uses the same reactions, but condenses the diethylamine with the bromethylphthalimide

* Scientific Section, A PH A Madison meeting 1933

in a sealed tube at 100° C without a solvent The method is inconvenient and usually incomplete due to caking of the phthalimide and the amine hydrobromide

It has also been prepared by condensing diethylamino ethyl chloride with potassium phthalimide, followed by acid hydrolysis

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES
E R SQUIBB AND SONS, BROOKLYN N Y

STEROL GLUCOSIDES

BY OLE GISVOLD

Whereas a survey of the literature reveals the fact that phytosterols, for the most part, occur as such, it also shows that several sterol glucosides have been reported, the so-called phytosterolins (1) If the amounts of sterols present in plants are small, those of the phytosterolins reported are even smaller Hence the sugars obtained upon hydrolysis have not been identified completely

Under these circumstances it naturally seemed desirable to synthesize sterol glucosides with glucose and other sugars Thus the glucose glucosides of sitosterol and cholesterol were prepared by Salway (2) in 1913, and that of ergosterol by Mac Corquodale (3) in 1930 Having worth-while amounts of several phytosterols on hand, the synthesis of as many of their glucosides as time and material permitted was undertaken

The method of preparation employed was essentially that used by Power and Salway in 1913 in the preparation of the sitosterol and cholesterol glucosides and again by Mac Corquodale in 1930 in the preparation of ergosterol glucoside

The procedure is essentially as follows, with some modification of deacetylation

Two Gm of dry sterol, 3 Gm of pure freshly crystallized tetracetyl bromglucose were dissolved in 100 cc of dry ether and 3 Gm of dry freshly precipitated silver oxide were added The mixture was shaken continuously for 8 hours, centrifuged, filtered and the ether distilled off The residue thus obtained was recrystallized once from 95% alcohol The partially purified product was dissolved in warm absolute alcohol and deacetylated with a solution of freshly prepared sodium ethoxide The insoluble precipitate thus obtained was filtered off and washed twice with small quantities of hot alcohol The crude product thus obtained was recrystallized from a hot saturated solution using a mixture of 95% alcohol and pyridine as a solvent The glucoside crystallized very well and a pure product was thus obtained

Preparation of Aceto Brom Glucose (4)—The procedure employed was that described by Levene and Raymond, and excellent yields were obtained

Dry HBr was passed into acetic anhydride until the latter contained 40 Gm of the gas per 100 Gm of the finished reagent For each 50 Gm of pure anhydrous powdered glucose 250 cc of the reagent were used The glucose was divided into 10 Gm portions, each kept in a stoppered test-tube The reagent was cooled to 10° and the glucose added under constant shaking The temperature was not allowed to exceed 30° The first portion of glucose dissolved quite slowly but the later portions more rapidly Before additional portions were added the solution was cooled to 10° After all the glucose had been added, the solution was cooled to 0° and dry HBr was passed into it until the total content was 60 Gm per 100 Gm of acetic anhydride The solution should be only a light straw color It was permitted to stand for one hour and then concentrated to half its original volume Thirty cc of toluene were added and the distillation continued until the residue became a thick syrup Three additional portions of toluene were added and removed by distillation All reagents were removed as completely

as possible The thick syrup thus obtained was taken up in ether, shaken with charcoal and the mixture filtered To this warm solution petroleum ether was added until the cloudiness obtained just threatened to remain The solution was allowed to cool when the product crystallized readily If the product fails to crystallize, a few seed crystals will readily induce crystallization

Preparation of Dry HBr—10–15 Gm of naphthalene were dissolved in a small quantity of xylene (or high boiling kerosene) and the solution placed in a 500 cc Florence flask The flask was connected by means of a bent glass tube with a Woolff bottle which contained 48% HBr solution with a little red phosphorus in suspension This, in turn, was connected with a U tube containing red phosphorus distributed by means of glass wool The gas was led through a $CaCl_2$ tower and then through two U tubes of P_2O_5 in glass wool The bromine was added to the naphthalene by means of a separatory funnel at a slow rate

Preparation of Dry Ether—The ether was shaken first with a saturated solution of KCl It was then allowed to stand over CaCl for several days and filtered P_2O_5 was added in excess The decanted ether was finally dried with sodium and potassium alloy prepared in the following manner Xylene was heated to 80°–90° in an evaporating dish and the previously cleaned sodium and potassium were placed into it and pressed together with a stiff spatula until a liquid alloy was obtained The ether thus dried was distilled and kept in 100 cc bottles previously dried in an oven at 110°

Preparation of the Silver Oxide—The silver oxide first used was prepared by precipitating equimolecular portions of silver nitrate and sodium hydroxide However, no condensation could be effected even though it was freshly prepared If however, the silver oxide was prepared in the following manner (5), condensation could be effected

A 10% solution of silver nitrate was heated to 86° and added rapidly, with rapid stirring, to a hot 2 3% solution of sodamide The precipitate was washed 5 times by decantation with hot water, then by decantation with 5 parts of absolute alcohol, and filtered by means of suction It was washed once with absolute alcohol dried in the air and then dried over P_2O_5 in a vacuum and used within 48 hours

In order to become acquainted with the technique in effecting condensation, cholesterol and ergosterol were experimented with As was mentioned before in the preparation of the silver oxide, several attempts were made before effecting condensation The elaborate procedure needed to run one experiment required some time However, the technique once mastered, no further difficulty was encountered although the yields were not high

Ergosterol Glucoside—The ergosterol used in this synthesis was obtained from oil of ergot The glucoside was obtained in fine white needles m p 314 5° The melting point recorded by Mac Corquodale was 315°

Stigmasterol Glucoside—The stigmasterol used was obtained from Echinacea It had a melting point of 170° Very fine needles of the glucoside were obtained which melted at 299°

Phytosterol Glucoside—The phytosterol used in this synthesis was obtained from milfoil and melted at 134° The synthesized glucoside was obtained in fine white needles which melted at 293°

Chloresterol Glucoside—The chloresterol used in this experiment was obtained from gall stones and had a melting point of 146° The glucoside was obtained in the form of fine white needles which melted between 280° and 284° The melting point recorded by Salway (2) was 270–285°

REFERENCES

(1) F B Power and A Salway, *J Chem Soc*, 103 (1913) 399
(2) A Salway, *Ibid*, 103 (1913) 1022

(3) Mac Corquodale *J Chem Soc*, 52 (1930), 2512
(4) P A Levene and A L Raymond *J Biol Chem*, 90 (1931), 247
(5) Helferich and Klein, *Annalen*, 450 (1926) 219

THE GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF BRUCINE AND STRYCHNINE AS DICHROMATE *

BY I M KOLTHOFF AND J J LINGANE

Brucine and strychnine salts give crystalline precipitates with alkali dichromates and chromates No use for quantitative purposes has been made of these precipitation reactions In the following, the properties of the alkaloid dichromates are described and a procedure is developed by which brucine and strychnine can be determined quantitatively as dichromates These are much less soluble than the corresponding chromates, the latter not being suitable for quantitative purposes

Materials Used—*Brucine* hydrochloride and *strychnine* sulphate solutions of known concentration[1] were used

Brucine Dichromate—This salt was prepared by precipitation of brucine hydrochloride with a slight excess of potassium dichromate solution The precipitate was washed thoroughly with water, it consisted of very fine crystals (Portion I) Part was recrystallized from hot water in order to obtain larger crystals (Portion II) Both portions were dried in the air

Strychnine Dichromate—Two portions were prepared in a way similar to that described above

Potassium Dichromate—A C P product was thrice recrystallized from water and dried at 200° Standard solutions were prepared by dissolving weighed samples in a known volume of water

Ferrous Ammonium Sulphate—C P Solutions were prepared in 0 5 to 1*N* sulphuric acid and standardized against dichromate

SENSITIVITY OF PRECIPITATION OF BRUCINE AND STRYCHNINE AS DICHROMATE

One cc of 1*N* potassium dichromate was added to 10 cc of the alkaloid solution A 0 004 molar brucine hydrochloride solution gave a crystalline precipitate after 1 minute of standing, 0 002 molar after 5 minutes, 0 001 molar after 15 minutes and 0 0005 molar solution a slight precipitate after 2 hours

The sensitivity of the strychnine precipitation was the same but the precipitate was formed more quickly Thus a 0 0005 molar strychnine solution gave a slight precipitate after 10 minutes of standing According to the above about 2 mg of brucine or strychnine can be detected in 10 cc of solution by the dichromate test

COMPOSITION OF THE PRECIPITATES

Water Content—The samples were kept over deliquescent sodium bromide until constant weight was attained They were then placed in vacuum desiccators

---

* Scientific Section, A PH A, Madison meeting 1933

[1] See THIS JOURNAL April 1934 page 302

over concentrated sulphuric acid or phosphorous pentoxide and kept therein until the weight was constant again Upon continued drying in a vacuum oven at 70° no further loss in weight was noticed The hydration and dehydration process appeared to be completely reversible, indicating that no decomposition had taken place on drying It should be mentioned that brucine dichromate which had attained constant weight over deliquescent sodium bromide lost 0 5 to 0 6% water when placed over deliquescent calcium chloride The strychnine compound lost under the same conditions 0 4 to 0 5% in weight Fairly large crystals of strychnine dichromate after attaining constant weight over deliquescent calcium chloride lost 0 86% in weight on drying in a vacuum at 70° The same crystals after having reached constant weight over deliquescent sodium bromide lost 1 35% in weight The same preparation was ground to a fine powder, the corresponding losses in weight were 0 82% and 1 23%, respectively

Chromium Content —Samples which had attained constant weight over sodium bromide were ignited and weighed as Cr_2O_3 In order to test the purity, the latter was transformed by a sodium peroxide fusion and oxidation with potassium bromate in acid medium to dichromate and later titrated with a standardized iron solution In other portions of the original samples, the dichromate content was determined in a volumetric way as will be described below

Alkaloid Content —Suspensions of the products were made alkaline with sodium hydroxide and the alkaloids shaken out with chloroform The alkaloid content of the chloroform was determined by evaporation to dryness, weighing and titrating in the usual way

The results given in Table I show that the brucine dichromate has the composition $(C_{23}H_{26}N_2O_4)2\ H_2Cr_2O_7\ 5H_2O$, M = 1096 6, and the strychnine dichromate $(C_{21}H_{22}N_2O_2)_2\ H_2Cr_2O_7\ 1H_2O$, M = 904 4 It is possible, however, that the latter product contains only half a molecule of water of crystallization

TABLE I —COMPOSITION OF BRUCINE AND STRYCHNINE DICHROMATE
(After reaching constant weight over deliquescent sodium bromide)

	(Brucine) $H_2Cr_2O_7\ 5H_2O$		(Strychnine)$_2H_2Cr_2O_7\ H_2O$	
	Found %	Calculated %	Found %	Calculated %
Water	7 8	8 2	1 3	2 0
$H_2Cr_2O_7$	19 93	19 88	24 04	24 11
Alkaloid	71 8	71 87	73 7	73 91

SOLUBILITY OF BRUCINE AND STRYCHNINF DICHROMATE

Samples were shaken with various solvents for 24 to 50 hours at room temperature The amount dissolved was determined by making the filtrate ammoniacal and shaking out with chloroform After evaporation of the latter the residue was titrated acidimetrically using methyl red as indicator In the solubility determination in alcohol a known volume of the filtrate was evaporated to dryness and the residue weighed

From the data given in Table II it is evident that the precipitation of brucine and strychnine is quantitative in a medium containing an excess of potassium dichromate amounting to a concentration of 0 05 molar

TABLE II —SOLUBILITY OF BRUCINE AND STRYCHNINE DICHROMATE (22 ± 2°)

Solvent	Brucine Dichromate Moles p l	Brucine Dichromate $(Bruc)_2H_2Cr_2O_7$ Mg per 100 cc	Strychnine Dichromate Moles p l	Strychnine Dichromate $(Strychn)_2H_2Cr_2O_7$ Mg per 100 cc
Water	0 000605	61 0	0 00050	45 0
0 0017 molar $K_2Cr_2O_7$	0 00020	21 0	0 00020	18 0
0 05 molar K Cr O_7	0 000065	6 5	0 000075	6 8
95% alcohol	0 00076	76 0	0 00069	62 0

GRAVIMETRIC DETERMINATION OF BRUCINE AS DICHROMATE

To 15 to 25 cc of the brucine salt solution containing 100- to 200 mg alkaloid, enough 0 25 molar potassium dichromate is added to make the concentration of the latter about 0 05 molar after the precipitation The precipitate is allowed to stand for at least one hour, filtered on a sintered glass crucible (1G-3) and washed with a saturated solution of brucine dichromate in water This is followed by three washings with 2–3-cc portions of alcohol and a few washings with ether Air is drawn through the crucible for a few minutes and the weighing made after standing in the air for at least 15 to 20 minutes The brucine dichromate $(Brucine)_2H_2Cr_2O_7\ 5H_2O$ contains 71 87% brucine

VOLUMETRIC DETERMINATION OF BRUCINE AS DICHROMATE

If brucine dichromate is dissolved in dilute sulphuric acid (1 to 2*N*), an appreciable oxidation takes place as indicated by the development of a red color of an oxidation product of brucine and the low values obtained in the titration with ferrous sulphate However, if the thoroughly wetted precipitate is dissolved in an excess of an acid ferrous iron solution the loss by oxidation is very small (of the order of 0 5%) The dichromate content of samples which showed constant weight over deliquescent sodium bromide was determined by dissolving a known weight in a standard ferrous ammonium sulphate solution which was 1*N* with respect to sulphuric acid and back titrating with standard dichromate in the presence of phosphoric acid and diphenylamine sulphonate as indicator The results of six determinations were 0 5 to 1% lower than those calculated Blank titrations of ferrous iron in the presence of brucine showed that the dichromate-iron reaction induces a slight oxidation of brucine by dichromate Thus it was found that in the titration of 250 cc 0 01*N* ferrous sulphate in 1 5*N* sulphuric acid in the presence of 160 mg brucine and 10 cc 25% phosphoric acid the error amounted to only 0 5 to 0 6%

PROCEDURE FOR THE VOLUMETRIC DETERMINATION OF BRUCINE

The washed precipitate as obtained in the gravimetric procedure is dissolved in an excess of a ferrous iron solution by adding 25 to 50 cc 0 1*N* ferrous ammonium sulphate in 1*N* sulphuric acid to the precipitate in the crucible and receiving the filtrate in an Erlenmeyer flask The crucible is washed thoroughly with 1 to 2*N* sulphuric acid and the excess iron in the combined filtrates titrated with 0 1*N* dichromate after addition of 10 cc 25% phosphoric acid and 10 drops of 0 2% diphenylamine sulphonate as indicator One cc 0 1*N* ferrous sulphate corresponds to 13 14 mg of brucine

The results of gravimetric and volumetric brucine determinations carried out under different conditions are given in Table III It is seen that both pro

cedures give corresponding results If the initial volume at the beginning of the precipitation is about 25 cc , the results are about 0 3% low, at a volume of 50 cc , 1 2%, and a volume of 100 cc , 2 2%

TABLE III —GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF BRUCINE

(0 1585 Gm brucine taken in all experiments)

Total Volume Cc	Concentration $K_2Cr_2O_7$ in Excess Molar	Time of Standing before Filtration Hours	Weight Ppt Gm	0 1*N* Fe^{++} Used Cc	Brucine Grav Gm	Found Vol Gm	Error Grav %	Error Vol %
25	0 06	0 7	0 2206	12 10	0 1585	0 1590	0 0	+0 3
25	0 06	0 7	0 2203	12 08	0 1583	0 1587	−0 1	+0 1
25	0 06	0 7	0 2195		0 1578		−0 4	
25	0 06	0 7	0 2198		0 1580		−0 3	
25	0 06	16 0	0 2191	12 02	0 1575	0 1579	−0 6	−0 4
25	0 06	16 0	0 2196	12 07	0 1578	0 1586	−0 4	+0 1
50	0 08	0 5	0 2166	11 85	0 1557	0 1557	−1 8	−1 8
50	0 08	0 5	0 2166	11 77	0 1557	0 1547	−1 8	−2 4
50	0 08	16 0	0 2190	12 10	0 1574	0 1590	−0 7	+0 3
50	0 08	16 0	0 2192	11 96	0 1576	0 1572	−0 6	−0 8
100	0 08	16 0	0 2151	11 78	0 1546	0 1548	−2 5	−2 3
100	0 08	16 0	0 2189	11 94	0 1573	0 1567	−1 1	−0 8
100	0 08	16 0	0 2130	11 65	0 1531	0 1531	−3 4	−3 4
25[a]	0 07	0 7	0 2203	12 08	0 1583	0 1588	−0 1	+0 2
25[b]	0 07	0 7	0 2190	12 03	0 1574	0 1580	−0 7	−0 3
25[c]	0 07	0 7	0 2186		0 1571		−0 9	

[a] Solution was 0 01*N* in hydrochloric acid
[b] Solution was 0 02*N* in hydrochloric acid
[c] Solution was 0 04*N* in hydrochloric acid

If the air-dried precipitates were kept over deliquescent sodium bromide until constant weight was reached, the results of the gravimetric determinations were about 0 5% higher than those reported It is not recommended to dry the precipitates in an oven at 100° to 110° since part decomposes on removing the water of crystallization at this temperature

The last three examples in the table show that the precipitations can be made from very dilute hydrochloric acid At higher acidities (*e g* , 0 1*N* HCl) than those given, part of the brucine is lost by oxidation

GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF STRYCHNINE

The determinations are carried out in exactly the same way as described for brucine, except that after washing with a saturated solution of the precipitate in water, the washing is continued with a saturated solution of the salt in 95% alcohol instead of with pure 95% alcohol If the latter is used, the precipitate shows a tendency to become colloidal and part of it runs through the filter This difficulty is obviated by washing with a saturated solution of strychnine dichromate in alcohol

It may be mentioned that the presence of strychnine is without influence upon the titration of ferrous iron with dichromate Some of the results of the strychnine determinations are given in Table IV The air-dried precipitate $(Strychnine)_2$-$H_2Cr_2O_7$ 1 H_2O contains 73 91% strychnine One cc 0 1*N* ferrous sulphate corresponds to 11 14 mg of strychnine

TABLE IV —GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF STRYCHNINE
(0 1066 Gm strychnine taken)

Total Volume Cc	Concentration $K_2Cr_2O_7$ in Excess Molar	Time of Standing before Filtration Hours	Weight Ppt Gm	0 1N Fe^{++} Used Cc	Strychnine Grav Gm	Found Vol Gm	Error Grav %	Error Vol %
25	0 08	0 7	0 1439	9 52	0 1064	0 1061	−0 2	−0 5
25	0 08	0 7	0 1439	9 52	0 1064	0 1061	−0 2	−0 5
50	0 08	1 5	0 1428	9 38	0 1055	0 1045	−1 0	−2 0
50	0 08	64 0	0 1428	9 35	0 1055	0 1042	−1 0	−2 3
50[a]	0 08	0 7	0 3607		0 2666		0 0	
100	0 04	20 0	0 1411	9 30	0 1043	0 1036	−2 2	−2 8

[a] 0 2665 Gm strychnine taken

In the first three experiments the concentration of the strychnine was 0 012 molar, in the next two, 0 006 molar, and in the last one, 0 003 It is evident that the determination gives results accurate to within 1% if the concentration of the strychnine salt is greater than 0 01 molar

SUMMARY

1 Brucine salts yield a precipitate with potassium dichromate, which after drying over deliquescent sodium bromide has the composition $(C_{23}H_{26}N_2O_4)_2 \cdot H_2Cr_2O_7 \cdot 5\ H_2O$ Strychnine dichromate prepared under the same conditions has the composition $(C_{21}H_{22}N_2O_2)_2\ H_2Cr_2O_7\ 1\ H_2O$

2 Gravimetric and volumetric procedures are described for the quantitative determination of brucine and strychnine as dichromates

SCHOOL OF CHEMISTRY, UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MINNESOTA

THE MICRO-PROJECTOR *

BY S H OSWALD AND L K DARBAKER

Projection of the microscopic slides is fundamentally the same as projection of transparent slides with the magic lantern, or of films with the moving-picture machine The machines all have the same essential parts and differ only in their construction, being altered according to the condition under which they are to be used and the purpose for which they are intended In micro-projection, on account of the small aperture of the lens and the very short focal distance, all these parts must be as nearly perfect as possible and must be assembled with the greatest care The modern projection microscope is of comparatively recent origin

In early times the lack of proper lenses and adequate light supply hindered the development of all projection apparatus and especially the micro projector It is not known who first discovered the phenomenon of projection Aristotle and Euclid mention the use of the principle in their writings, and Arabian works from the eleventh century give a description of the "camera obscura," the forerunner

* Scientific Section, A PH A Madison meeting 1933

of the modern projection machines Until the year 1568, no lenses were used in these projectors, mirrors and pin-hole apertures were used with the sun as the only source of light About that time, Daniel Barbaro used a convex spectacle-lens to increase the brilliance of the image After this discovery, great strides were taken in the field, but the first workable magic lantern was produced by Walgensten, a Danish scientist in 1665 His machine was a crude contraption A naked flame from a smoky oil lamp furnished the light, a single lens answered the purpose of both condenser and projection lenses, and the demonstration was in an absolutely dark room only a few feet square The small room was necessary because the projector had to be outside the room, and its range was very short The spectators stood inside a large camera and viewed the image exactly as it would be recorded on a modern camera plate, in most cases inverted, for the practice of inverting the slide in the machine had not then become popular

In the early part of the 17th century, a number of scientists worked simultaneously but most credit must be given to Kepler for the development of the micro-projector His work was chiefly with lenses, and in 1611 he published a treatise which set forth the value of using additional lenses in projection and advanced many theories which are applied to-day While this short historical summary has been of the development of the magic lantern, it becomes also the history of the micro-projector which is simply a magic lantern with a relatively short projection objective Its scope begins where that of the magic lantern ends and includes the very smallest of microscopic objects One machine cannot be expected to cover the whole range, but the possibilities and value of the micro-projector to the teacher or lecturer are apparent With a large screen image of the microscopic field, the teacher is able to show to a large group the important points of the specimen and point out peculiarities of structure and form He can easily indicate the special points which, though less striking, are often most important In this way, the need for individual help to those learning to use the microscope is eliminated, and more time is gained for study of the object

Although there are many micro-projectors on the market to-day, there are several reasons why it is advantageous to build rather than to buy a machine The first of these is the cost factor In spite of the fact that most manufacturers have reduced their retail price recently, it is possible to build a micro-projector for about half the cost of the lowest priced instruments Many of the parts can be made or assembled from discarded material, and the few parts that must be purchased are very reasonably priced since the cost of assembling is eliminated Another advantage is that the machine can be constructed to meet the requirements of specific conditions under which it will be used The commercial machines are all made to operate perfectly in certain definitely stated conditions, and if these conditions are changed, as they are almost certain to be, the efficiency of the micro-projector is reduced In building a micro-projector the conditions become the constant factor, and construction is altered accordingly

There are comparatively few parts needed for an efficient micro-projector, but those used must be of good quality and adapted to the type of machine that is to be built The light must be the most brilliant possible, the condenser lens must be of clear white glass and should be corrected for chromatic and spherical aberration The mirrors and objective lens should be as nearly perfect as can be ob-

tained The stage for supporting the slide may be as simple or complex as desired, but, for ease of operation, a mechanical stage of some kind should be used An efficient water cell for cooling the light rays is also necessary to prevent damage to the specimen and apparatus These are the essential parts and, if assembled carefully, are all that are needed These can all be modified in many ways to make operation easier and results more certain A very important factor to be considered is the room and screen for the demonstration The room should be absolutely dark, even a small ray of light striking the screen will lessen the brilliance of the image The screen must be of the best, but, as most screens in common use will give satisfactory results, this subject requires no discussion It may be stated that a pure white, entirely opaque screen has been found best

Probably the most important part of the micro-projector is the source of light, for with a poor light the most perfect of machines cannot be satisfactory In passing through the various units, a portion of the light is absorbed by each, with the result that less than ten per cent of the light produced ever reaches the screen This necessitates the use of a very powerful light if the image is to be brilliant at any great distance From early times various light sources have been used, the first being sunlight which remains the most brilliant of all Since it is seldom convenient to use sunlight for projection, other lights were invented and developed for use in its stead From the naked flame of the animal and vegetable oils developed the kerosene lamp with a glass chimney With the discovery of electricity came many types of electric lights, the first of which was the arc light, and, though many types of incandescent lamps have been produced and are used to day, it is next to sunlight, the most brilliant of all The carbon arc lamp is the best suited for micro-projection, although recently several concentrated filament bulbs have been produced which are more convenient to operate and give good results under limited conditions Of all the arc lamps, the one with the carbons at right angles has been found to be best for micro-projection The reason is that the crater of the horizontal carbon produces a brilliant light in a concentrated area, which can be kept constantly in the axis of projection This condition is very important where a variation of a fraction of an inch might throw the light completely outside the small opening of the objective The light used in the machine about to be described, was an automatic carbon arc lamp with carbons, six to eight millimeters in diameter at right angles, and operated on a current of four to ten amperes It was manufactured by the Bausch and Lomb Optical Co of Rochester, N Y, and gave splendid results on direct or alternating current

THE RHEOSTAT

With any arc light, a rheostat or resistance is necessary to regulate the amount of current and prevent overloading of the circuit when the carbons are brought together This rheostat may be of the variable type, which permits adjustment of the current without interruption, or of the fixed type, which gives satisfactory results if the current is fairly constant The amount of resistance to use is determined by the current required by the arc lamp A constant current of the correct amperage must be supplied if a steady, brilliant light is to be expected If possible, this unit should be purchased with the arc lamp, although a good resistance can be made from iron, German silver or nichrome wire of the correct diameter and length

The mounting can be made on any non-inflammable non-conductor Some provision should be made for conducting away the heat formed, such as the free circulation of air or immersion in water The resistance for the light mentioned above was constructed of coiled nichrome wire, wound on grooved porcelain, which also aided in conducting away the heat A fuse plug or other circuit breaker, on or near the machine, is necessary to prevent damage to the wiring system in case of accident The fuse should be of slightly lower capacity than those of the lighting system so it will be the one to burn out as the result of an overload

THE CONDENSING LENS

The next unit to be considered in the construction of a micro-projector is the condensing lens As its name suggests, the purpose of this lens is to condense or converge the rays of light to a point This is necessary in order to concentrate as much of the light as possible on the specimen at a certain point so that most of it will enter the opening of the objective This condensing lens may be composed of one, two or three elements Those of one element are rarely used because of their very long focal distance Those with three elements have proven best for micro-projection because the focal distance is convenient, and they are entirely free from chromatic aberration The two element lens, although of slightly longer focal distance and more liable to chromatic aberration, has been used successfully in many cases This type was used in the foregoing experiments, because it was less expensive and absorbed less light than the three-element condenser A slight spectrum was produced but was entirely eliminated by careful adjustment of the substage mirror

THE COOLING CELL

Another important part of the micro-projector which should be considered with the light and condenser is the water-cooling cell This is a necessity because a great deal of heat is produced by the arc lamp, and both the light and the heat are brought to a point by the lens and concentrated in a small area This heat would quickly destroy any inflammable substance placed in the point of focus, which is the position of the slide to be projected The water cell, when placed in the path of light, absorbs a large part of the heat but permits most of the visible light rays to pass through The cell is very simple of construction, consisting essentially of a narrow glass cell with parallel sides, filled with water It may be from one to ten centimeters thick, but more than five centimeters is rarely necessary and should not be used, since more light is absorbed by thicker layers of water A cell one centimeter thick will absorb about seventy per cent of the heat and usually prevent serious damage when used with the ordinary small arc lamp Good results were obtained with a cell one and a half centimeters thick, constructed of ordinary window glass mounted in a ring of tinned sheet iron and made water-proof with aquarium cement No other substance was added to the water except a trace of copper sulphate to prevent the growth of algæ and molds

PROJECTION

These parts mentioned may all be considered as units of the light source for they all aid directly in producing the light and making it suitable for use in projec-

tion The remaining parts are those for utilizing the light to project the image The most important of these is the microscope or microscope objective which is also the projection lens An ordinary microscope can be used and will give good results in some cases, but, for the best results, the microscope should be modified to adapt it for its position in the machine The narrow barrel should be replaced by one of larger diameter, and such mirrors and extra lenses added as necessary for conditions under which the machine is to be used By describing the modifications of the microscope used, these changes can be pointed out In the first place it was found that the eyepiece of the microscope absorbed much of the light and diffused the image to such an extent that the light would not reach the screen from any great distance The eyepiece was discarded, and it was possible to pro ject a concentrated beam which produced a sharp image at a distance of thirty feet, but the field was small The area was increased by using a tube of larger diameter, but best results were obtained by removing the barrel entirely and using only the objective It was desired that the microscope be in its natural vertical position so that the stage be horizontal for showing water mounts, glycerin mounts or living specimens This made it necessary to use a mirror below the stage to reflect the light from the arc lamp up through the slide and the objective For this purpose the regular plane sub-stage mirror was used, and was brought into posi tion by moving the microscope The correct height was attained by placing the microscope on a platform This mirror was adjusted at an angle of forty-five de grees from the horizontal so that the reflected beam would be exactly vertical It was also placed a little nearer the light than the exact focal point so that the reflected rays would converge at the stage level rather than at the mirror Another mirror was necessary above the objective to reflect the light beam at right angles in order that it could be focused on the screen Because of its position and function it may be called the projection mirror, just as the last lens in a magic lantern or moving picture machine is called the projection lens At this point the microscope could hardly be identified The stand and base had been left intact, but the barrel had been removed, and a mirror had been mounted above the objective This modified microscope was found to give good results at a distance of thirty feet, but the image was very large and was not brilliant, on account of the diffusion Since the projection stand was over forty feet from the screen, experiments were neces sary to find means of reducing the size of the image and thus increasing the bril liancy After several unsuccessful attempts, it was found that a projecting lens such as those used in magic lanterns, placed immediately in front of the projection mirror, greatly reduced the size of the image and increased the brilliance It was also found that moving the lens nearer to or farther from the projection mirror, de creased or increased the size of the image The lens was mounted on the microscope so that it moved with the objective and was always in the same relation to it A rack and pinion adjustment in the mounting of the lens, permitted easy adjust ment of image size

The parts mentioned are all necessary if efficient projection and ease of opera tion are to be obtained, and, on account of the number of times the light is re flected, all should be the best of their kind so that no more light is lost than is abso lutely unavoidable The assembling of these parts is also of prime importance All parts must be mounted in the proper relation to the other parts, if the most good

is to be obtained from the parts selected The machine must be entirely light-proof so that only the light which has passed through the projection microscope will reach the screen The center of the arc must be exactly in line with the center of the condenser lens and the sub-stage mirror, which, in turn, must have its center in line with the objective opening The first step is housing the arc lamp Since there are a number of satisfactory methods for doing this, no discussion is necessary, a satisfactory housing can be made from sheet iron or tinned sheet iron and will give good service The next step is to determine the optical axis and to devise a means of keeping the parts in the axis while being adjusted to their correct position For the purpose a track of brass rods or wooden molding can be used to good advantage

In the machine built in this experiment the lamp housing was made of tinned sheet iron An aperture large enough to accommodate the condenser lens was provided in one end, and the light mounted inside at such a distance that the focal point was about eight inches The water cell was mounted between the light and the condenser This unit of arc light, condenser and water-cell was mounted on a wooden base board, large enough to allow room for mounting the microscope in front, and the resistance unit, fuse plug and switch behind, the source of light The microscope was attached to the stand to elevate the substage mirror into the axis of projection This was mounted on the base board, the final adjustments being made with the light burning to insure exact centering It was placed so that the sub-stage mirror was nearer the condenser than the focal point This position caused the light to come to a point just at the stage and obviated the use of a sub-stage condenser A support for the projection mirror and projection lens was made to bolt to the frame of the microscope The mirror was attached to the support by a ball and socket joint, and the lens by a rack and pinion adjustment A vertical shield of wood was placed in front of the microscope to prevent any stray light from reaching the screen, and the entire machine was painted black to prevent reflection When completed the machine was small and compact enough to be easily carried, and was simple to operate, it being only necessary to connect the cord to a light socket, start the arc lamp and place a slide on the stage Focusing was accomplished by the regular coarse adjustment of the microscope No adjustment of the projection lens was necessary except to increase or decrease the size of the screen image

In a trial demonstration slides of plant sections and microscopic animals were projected from a distance of fifty feet The images were clear and brilliant and showed plainly the structure and points of interest Its practicability has not yet been completely determined but indications are that it will be an aid in teaching all branches of microscopy, microbiology and histology

THE MICROSCOPICAL LABORATORIES
PITTSBURGH COLLEGE OF PHARMACY

The Water of Crystallization of Quinine Sulphate ' by H Wales —Scientific Section

Drying a product in an oven shows the amount of water present but does not prove that it is present as a hydrate Vapor pressure measurements on quinine sulphate show that it crystallizes from water at room temperature as the octohydrate Upon drying this passes directly to a dihydrate No evidence of the existence of a heptahydrate was obtained

PHYSICS IN PHARMACY

BY JOHN URI LLOYD, WOLFGANG OSTWALD AND HANS ERBRING

(*Concluded from page 331, April issue*)

II The *Second Divisional Effect* (cf *Fig 16, II*) is characterized, first, by a striking constancy of the height of rise, resp , the difference of level The system is apparently in hydrostatic equilibrium Nevertheless, considerable changes are taking place in it, as shown in *B*, *C* and *D* The hydrostatically repressed salt solution moves upward again, as is seen by the migration of the zone of diffusion (Cf *B* and *C*) Simultaneously with this return motion an increasing difference of weight must arise again (cf *Fig 16, II-B*)

No doubt *diffusion* is responsible for this movement of the salt in opposite direction, which becomes apparent to the eye by the formation of a gradient of concentration The zone between colored salt solution and water is no longer relatively sharp, but spreads out The transition becomes the more gradual the longer the duration of this divisional effect

Now the fact is very striking that difference of level is not noticeably changed, in spite of the diffusion and in spite of the increase of weight of the salt liquid as a consequence of this diffusion If hydrostatics alone were responsible, this fact would be incomprehensible Hence we must look for forces which eventually act independently in opposite direction to hydrostatics, and which therefore may be able to compensate the hydrostatic pressure in the second divisional effect

In this connection we may think first of *kinetic* factors As stated before, the equalization of hydrostatic pressure in filter paper consumes much time We may imagine that in the 2nd divisional effect the process of diffusion takes place faster than the hydrostatic equalization Retardation of the hydrodynamic velocity of water by the capillary spaces of the filter paper is probably much greater (in conformity with Hagen-Poiseuille's law) than the retardation of diffusion by capillary walls Therefore the constancy of the difference of level, notwithstanding the formation of a new hydrostatic disequilibrium by diffusion, could be explained by the great differences in diffusion velocity, and hydrodynamic velocity of the water In this sense, the constancy of the difference of level would be merely a phenomenon of retardation, as it were, a "hydrostatic supersaturation "

However, the part played by osmotic water attraction discussed before, can not be neglected If the diffusing molecules in a capillary system are able to attract solvent in the manner described, they must also carry this osmotically bound water along with them in diffusion Such carrying of osmotically attracted water would indeed be able to counteract the hydrostatic equalization of level The water carried osmotically from left to right would therefore be approximately equal to the water which would be carried hydrostatically from right to left through increase of weight of the salt tube We have two opposite water movements Osmotic carriage of water from left to right, and hydrostatic movement of water from right to left, which about compensate each other in the second divisional effect, the water is thus virtually "immobilized " An osmotic carriage of water would then furnish the theoretically required pressure opposite the hydrostatic pressure, and at the

same time would explain the constancy of the difference of level during the 2nd divisional effect notwithstanding diffusion progressing

III The *Third Divisional Effect* is characterized by slow disappearance of the difference of level, *i e*, by a *reversion* of the direction of liquid movement, while the zone of diffusion migrates into the left tube and there is simultaneous decrease of the difference of weights of the two liquid cylinders in the siphon tubes (cf *Fig 5-III*) In this part of the process, diffusion is the sole driving force Through diffusion the salt is transferred into the water vessel, diminishing thereby, visibly, more and more the differences of weight, resp , the hydrostatic difference of pressure which still existed in the 2nd part of the process

With progressive diffusion a moment will be reached where the difference of weights between the 2 liquid cylinders in the siphon is zero, and then will attain a negative value The longer water cylinder, containing but little salt, will become heavier than the short salt cylinder, which, however, is richer in salt Thus a decrease of the difference of level and gradual equalization can take place hydrostatically

However, it is very striking to note how exceedingly slowly and gradually this hydrostatic equalization takes place Even after weeks of experimentation, in the course of which large quantities of dissolved salt could be demonstrated in the water vessel, complete equalization of level had never been reached This retardation again may be caused by either kinetic factors (hydrostatics in arrear toward diffusion), or the capillary-osmotic fixation of water in the strip of filter paper, the function of this fixation we were able to recognize very distinctly in the 2nd divisional effect When hydrostatic current and diffusion have motions in the same direction, in this case also will water be retained or osmotically immobilized in the filter paper in conformity with the ideas developed before Similarly, water contained in salt-free filter paper shows, as is well known, depression of freezing point, compared with water in bulk

REVIEW

The theory of the Effect may be briefly outlined in the following summary We accept three kinds of forces to share in the phenomenon Primary hydrostatic forces, secondary hydrostatic forces in consequence of diffusion, and capillary-osmotic forces, which may act in opposition to hydrostatic forces The first main rise is principally a hydrostatic effect (Capillary siphon) The hydrostatic and osmotic effects of diffusion have only a secondary share (Diffusion siphon effect and capillary osmosis)

The Second Division, characterized by the constancy of the difference of level in spite of pronounced diffusion, leads us to assume a manifestation of capillary osmosis The hydrostatic excess pressure caused by diffusion, is not visibly balanced because the salt molecules contained in the capillary spaces osmotically attract and immobilize water molecules In the Second Division, this capillary-osmotic attraction of water compensates the hydrostatic excess pressure caused by diffusion

In the Third Division, salt gradually passes over into the (longer) water tube of the siphon, rendering this liquid heavier until the sign of the hydrostatic difference of pressure reverses, and the difference of level again begins to disappear The exceeding slowness with which this equalization takes place, notwithstanding a

strong passage of salt into the water tube, is again ascribed to capillary osmotic immobilization of water in the filter paper

Reviewing again the experimental details recorded in the second part of this work, from the point of view of the theory stated, we find them in agreement with theory The greater length of the capillary connecting tube favors the siphon effect (on account of the longer, heavier cylinder of salt solution) In addition, the capillary-osmotic forces have a more telling effect in a longer horizontal connecting tube The influence of the nature of the filter paper, especially its content of capil lary spaces upon tangential "irrigation" of the paper, seems to argue with especial force in favor of not only hydrostatic but also capillary-osmotic forces in producing the Effect For aside from the velocity of flow, a change in the cross section of a purely hydrostatic siphon does not change in the least a purely hydrostatic effect. Our experiments with filter paper whose pores are clogged by formation of precipi tates, we interpret in the same sense, also in reference to the researches of F E Bartell, E Manegold and others, on the Osmosis of "permeable cells" The fact that electrolytes as well as non-electrolytes show the Effect which becomes the more pronounced the higher the concentration of the salt solution agrees with all pro posed divisional explanations

The insignificant positive influence of temperature is somewhat surprising It is true that the densities of salt solution and water are influenced in the same direc tion by increase of temperature, while hydrostatically only the *difference* in density becomes active On the other hand, both fluidity of water and the solution, as well as diffusion velocity, are materially increased with rising temperature, not so, however, the osmotic pressure which, as we know, increases by only 1/273 per degree

Simple as the Effect appears to be, its dynamics is very involved, as the preceding Analysis demonstrates For the further investigation of these peculiar liquid move ments in capillary systems, such experimental arrangements particularly suggest themselves, in which the hydrostatic effects are eliminated as much as possible For example, a horizontally placed and linearly extended capillary system of the same order might be such an arrangement Although such an experiment seems very simple, it is by no means carried out as easily, as experiments of our own in this respect have already shown Influences of gravity are very difficult to elimi nate, even with horizontal arrangement, and an exact leveling in the case before us is not simple We shall report on experiments of this kind in a later communica tion

SUMMARY

1 When two cylinders which are filled, resp , with concentrated salt solution and water, are connected by a strip of filter paper and the liquid is protected against evaporation, there will be a transfer of water into the salt solution This experi ment described by the senior author about 35 years ago, was again studied in detail, also quantitatively

2 The Effect was easily reproduced There are increases of level, *e g* , up to about 12 mm , and total differences of level to about 28 mm It is further noted that within long periods of time (8 days or more), a maximum effect is reached, thereafter, the difference of level again decreases

3 From a great number of numerical data, the following are presented

(*a*) The Effect strongly increases with increasing length of the capillary connecting piece, *viz*, the strip of paper

(*b*) Previously wetting the paper with the solution likewise causes a strong increase of the Effect

(*c*) It is not the transversal fineness of the pores of the paper, but rather the *longitudinal capillary, i e*, highly developed fibrillary structure of the paper which gives the maximum effects, soft, absorbent paper acts better than hardened, dense paper Improvement is also attained by reducing the diameters of the capillary tubes by partially filling the spaces with highly dispersed precipitates, *e g*, $BaSO_4$

(*d*) The Effect is obtained not only with electrolytes ($FeCl_3$, $AlCl_3$, $BaCl_2$, KCl), but also with non electrolytes (Sugar, Urea)

(*e*) The Effect increases parallel with concentration, initially it increases with good approximation linearly with concentration In the case of Urea, the concentration curves of increases of level are curved faintly convex toward the concentration axis, which is in accord with the concentration curves of osmotic pressure of concentrated molecularly dispersed and colloidal solutions

(*f*) The Effect has a small positive temperature coefficient

4 The problem as to the nature of the driving forces in the observed phenomenon is investigated

It is shown that there are at least three sources of energy sharing in the production of the effect

(1) Hydrostatic forces in capillaries, *Capillary siphon effect*

(2) Diffusion in capillaries *Diffusion-siphon effect*

(3) Osmotic attraction of liquids in capillary systems *Capillary Osmosis*

All three forces come into play

At the beginning of the phenomenon, the *hydrostatic effect* is dominant, then appear *diffusion* and *capillary osmosis*, and toward the end, again *hydrostatics* terminates the process

5 Brief reference is made to the significance of the Effect in geological movements of liquids (subterranean water courses), the theory of swelling, and in biological movements of liquids

---

ABSTRACT OF A PAPER BEFORE SCIENTIFIC SECTION, A PH A

Chemical Examination of Some Urographic Preparations " by George W Collins

Several years ago Rowntree and his associates demonstrated that following the injection of sodium iodide solution introduced through the ureter radiographic visualization of the pelvis of the kidney, the ureter and the bladder, pyelograms could be made Subsequently, many iodine compounds, both simple and complex have been prepared and tested for their roentgenologic usefulness The author reports the findings of chemical examinations of two different specimens of Iopax, also the examination of a third specimen of the product by a disinterested consulting laboratory Several points of interest are brought forth in the investigation including petrographic data confirming the chemical findings A report is made of an examination of another urographic preparation known as Skiodan Chemically these products differ markedly Iopax is the sodium salt of an acid derivative of an iodized oxo aminopyridine, containing 42 per cent iodine in organic combination, while Skiodan is the sodium salt of *mono iodomethane sulphonic* acid and contains 52 per cent organically combined iodine The evaluation is made of tests and standards for the identity purity and assay of these two preparations In addition there is a resumé of three other iodized products recently introduced and used *in pyelography*

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore Maryland

APPARATUS AND MANIPULATIONS

Andrews, Marvin J
Determination of the reasonable, or permissible, margin of error in dispensing II Ointments
JOUR A PH A , 23 (1934) 350
Brown H Treves
Hand homogenizing machines
Pharm J 132 (1934) 307, 337
Defrance E
Testing of glass containers for medicines
J pharm Belg , 16 (1934), 267
Evans, Theodore W
Extraction by immiscible solvents
Ind Eng Chem 26 (1934) 439

PHARMACOPIŒAS AND FORMULARIES

Casparis P
Review of the Swiss Pharmacopœia V (*Cont*)
Schweiz Apoth Ztg 72 (1934) 41 185
Flück, H
Review of the Swiss Pharmacopœia V
Schweiz Apoth-Ztg 72 (1934) 57
Schou, Svend Aage
Galenical preparations of the Danish Pharmacopœia, 1933
Arch Pharm og Chem 41 (1934) 201, 229

PHARMACEUTICAL PREPARATIONS

Cain R A , and Langenhan H A
Liquor Calcis Sulphuratæ
JOUR A PH A 23 (1934), 344
Feist, K
Corrective for the taste of potassium iodide mixtures
Apoth-Ztg , 49 (1934), 437
Gsturner F
Preparation of tinctures
Pharm Ztg 79 (1934), 310, 328
Kornilov N M
Tincture of iodine
Bull Nauch Issledov Khim Farm Inst (1931), 221–223 through *J Soc Chem Ind* , 53 (1934) 300B
Kuhn, A and Schäfer, G
Contribution to the knowledge of homeopathic preparations
Pharm Ztg , 79 (1934), 373
Ponte, D
Green coloration developed by an injectable camphorated oil
Boll chim-farm (1933), 72 953–955, through *J Soc Chem Ind* , 53 (1934), 300B
Regnier, Jean, and David, Robert
Influence of hydrogen-ion concentration on stability of cocaine hydrochloride solutions during sterilization
Bull sci pharmacol , 40 (1933), 650
Rothenkirchen, Otto
Ammonia liniment, D A B 6
Pharm Ztg , 79 (1934) 286
Stainier, Carl, and Massart, Jean
Pharmacy of carbon tetrachloride
J pharm Belg , 16 (1934), 289

PHARMACOLOGY TOXICOLOGY AND THERAPEUTICS

Anon
Derris as an insecticide
Pharm J , 132 (1934) 311
Anderson Robert C , and Chen, K K
The hyperglycemic action of forty amines
JOUR A PH A 23 (1934), 290
Beaune, A , and Balaceanu, V
Action of cardiotonics on the isolated ventricle of the snail
Bull sci pharmacol , 50 (1933), 658
Brandes, W W
Nickel carbonyl poisoning
J A M A , 102 (1934), 1204
Frumess, Gerald M
Allergic reaction to dinitrophenol
J A M A , 102 (1934) 1219
Hoffman, Arthur M Butt, E M , and Hickey N G
Neutropenia following amidopyrine
J A M A 102 (1934), 1213
Kindel, Daniel J , and Costello, Maurice J
Staphylococcus toxoid in the treatment of pustular dermatoses
J A M A 102 (1934), 1287

Lumiere, Auguste
Use of thioderivatives of antimony in therapy
Bull sci pharmacol, 41 (1934) 129
More, W
Poisoning by paraldehyde
Brit Med J No 3818 (1934) 428
Pfister F F
Rash from vitamin preparations
J A M A, 102 (1934), 533
Poole, Fenn E, and Haining Robert B
Sudden death from dinitrophenol poisoning
J A M A, 102 (1934), 1141
Randall, Clyde L
Severe granulopenia following the use of barbiturates and amidopyrine
J A M A, 102 (1934) 1137
Raymond-Hamet
Apropos the physiologic assay of digitalis
Bull sci pharmacol 41 (1934) 161
Rosenthal, Sanford M
An antidote for acute mercury poisoning
J A M A, 102 (1934), 1273
Rozier and Jullien
Therapeutic action of sodium antimony-thiopropanol sulphonate in canine leishmanioses
Bull sci pharmacol, 41 (1934) 149
Tainter, M L, and Wood D A
A case of fatal dinitrophenol poisoning
J A M A 102 (1934), 1147
Todd, J P and Sillar Isabella M
Effect of the chlorides of a few well-known bases on bacterial growth
Chem & Drug 120 (1934) 399

BOTANY AND PHARMACOGNOSY

Berger, Franz
New method for standardizing pollen for use in the preparation of pollen extracts
Pharm Zentralh 75 (1934), 239
Gabel, L F
Comparison of Karaya gum and tragacanth
Jour A Ph A, 23 (1934), 341
Kondo, H, and Ikawa S
Investigation of the constituents of "Senso" Part III
J Pharm Soc Japan, No 624 (1934) 22
LaWall, Charles H, and Harrison Jos W E
The arsenic content of chondrus
Jour A Ph A, 23 (1934), 308
Mollett Charles E, and Christensen B V
Coptis occidentalis, Salisbury (Fam Ranunculaceæ)
Jour A Ph A 23 (1934), 310
Richards, L W, and Lynn E V
An examination of Ceanothus velutinus
Jour A Ph A 23 (1934), 332

ALKALOIDS AND GLUCOSIDES

DeKay H G and Jordan C B
Assay of hyoscyamus
Jour A Ph A, 23 (1934), 316
Ekkert, Lad
Contribution to the reactions of epinephrine and ephedrine
Pharm Zentralh, 75 (1934) 208
Ekkert Lad
Reactions of betaine
Pharm Zentralh, 75 (1934), 209
Ekkert, Lad
Contribution to the reactions of digitoxin, digitalin and digitonin
Pharm Zentralh, 75 (1934) 228
Goris A, and Chalmeta C
Observations on the determination of ecgonine
Bull sci pharmacol, 40 (1933) 641
Kolle Finn and Gloppe Kris E
Alkaloids of Narcissus poeticus L
Pharm Zentralh, 75 (1934) 237
Kolthoff, I M, and Lingane J J
The determination of strychnine and brucine as hydroferrocyanides and their separation by means of ferrocyanide
Jour A Ph A 23 (1934), 302
Pedersen Holger Leth
Electrometric titration of solutions of quinine salts
Dansk Tids Farm 8 (1934) 17
Rusting, N
Determination of morphine in opium
Pharm Weekbl, 71 (1934) 333
Wagenaar, M
Contribution to the microchemistry of quinine carbonate
Pharm Weekbl, 71 (1934) 316

OILS FATS AND WAXES

Lindholm, H R V
Chemical and physical determination of vitamin A in codliver oil
Dansk Tids Farm 8 (1934) 73

ESSENTIAL OILS AND RELATED PRODUCTS

Gros R and Pichon G
Determination of allylmustard oil in mustard flour
J pharm chim 19 (1934) 249
Redgrove, H Stanley
Perfumes used in fumigating
Pharm J 132 (1934), 363
Zeligson, N E and Boldyreva, E S
Determination of vanillin

Bull Nauch Issledov Khim Farm Inst (1931), 274–277, through *J Soc Chem Ind*, 53 (1934) 300B

ANALYTICAL METHODS AND RESULTS

Beukema Goudsmit M
Contribution to the quantitative determination of phenol, salicylic acid and cresol
Pharm Weekbl, 71 (1934) 380

Dumont, P and Declerck A
Examination of ointments with a lard base to detect substitution
J pharm Belg 16 (1934) 227 243

Eury, J
Volumetric determination of formaldehyde in the presence of sulphites
J pharm chim, 19 (1934) 261

Faufel K and Thaler
Detection of glycerin in medicinal preparations and cosmetics
Pharm Ztg, 79 (1934) 341

Gillot, P, *et al*
Titration of tannins with chromic mixture
Bull sci pharmacol, 41 (1934) 137

Horkheimer, Ph
Assay of nitroglycerin solutions
Pharm Ztg 79 (1934) 353

Kampf, Paul
Studies on the standardization and adulteration of drugs by means of capillary analysis and the quartz lamp
Pharm Acta Helv, 8 (1933), 214

Masagetov P S
Determination of santonin in plant materials
Khim Farm Prom (1932) 68–71, through *J Soc Chem Ind*, 53 (1934) 301B

Miller, Jul Aug
New constants for drugs and galenicals III Copper numbers of some obsolete drugs
Pharm Zentralh 75 (1934) 205

Miller Jul Aug
New constant for drugs and galenicals, the copper number
Pharm Zentralh, 75 (1934), 81

Patzsch, H
Quantitative methods for the determination of animal lipoids
Pharm Zentralh, 75 (1934), 98

Penau, H, and Audic, R
Assay of soluble enzymes of pharmaceutical importance
J pharm chim, 19 (1934), 329

Schorn E J, and Brown, William S
The use of adsorption indicators in argentometric assays
Pharm J, 132 (1934), 361

Schorn, E J and Baird Janet Y
Argentiometric assay of ammonium chloride, B P, 1932
Pharm J, 132 (1934), 361

Straub, Johann and Mihalovitis Eugen
Determination of veronal in urine
Pharm Zentralh, 75 (1934) 226

Tschentke H L
Chemical examination of tri-chloroethylene for anesthesia
Ind Eng Chem Analyt Edit 6 (1934) 21

Vaille Charles
Reactions for differentiating argyrol, collargol, electrargol and protargol
J pharm chim 19 (1934), 256

Willson F E
Pancreatin and its assay
Jour A Ph A, 23 (1934) 295

ORGANIC CHEMICALS

Cornish, R E *et al*
Purification of vitamins
Ind Eng Chem, 26 (1934) 397

Braker W and Christiansen W G
Di-β-bromallylamino-ethyl-*p*-amino benzoate
Jour A Ph A, 23 (1934) 322

Spur B
New results of vitamin research
Dansk Tids Farm 8 (1934) 101

ABSTRACTS OF PAPERS BEFORE SCIENTIFIC SECTION, A PH A

'The Metabolism of Dulcitol and Dulcitan' C Jelleff Carr and John C Krantz, Jr

This investigation has for its purpose the determination of the fate of Dulcitol and its first anhydride Dulcitan in the white rat Liver glycogen and muscle glycogen and respiratory data are included

'The Chemical Assay of Adonis Convallaria and Apocynum," by Margarethe Oakley James C Munch C Jelleff Carr and John C Krantz, Jr

An effort has been made to apply the Knudson-Dresbach chemical method for the determination of the digitalis glucosides to the determination of the glucosides in Adonis, Convallaria and Apocynum

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING II OINTMENTS

BY MARVIN J ANDREWS

(*Concluded from page 356 April* JOURNAL)

VARIATION IN CAPACITY OF OINTMENT JARS PURCHASED FROM MANUFACTURERS

A second series of tests was carried out to determine to what extent jars of the same brand vary in capacity With this object in view, jars labeled 1/2-ounce, 1-ounce and 2-ounce were purchased from four of the leading manufacturers of ointment containers, and these were subjected to the same tests in each case

To obtain the desired data, ten jars were selected at random out of each box of twelve 1/2-, 1- and 2-ounce jars Each of these jars was filled by 10 different students to obtain a fair average for the capacity of the jar Petrolatum was selected as the base for filling, as it is the lightest of any of the four bases used in the tests, and also because it is the easiest to handle It was poured in the melted condition between 43° and 45° C to insure the absence of air-pockets which are always formed when the base is packed in the solid condition The excess was removed by running the edge of a spatula over the top of the jar and wiping off any material adhering to the sides The jars were not weighed until cool

Each of the four manufacturers whose jars were used in these tests was requested to state what standard was used in determining capacity Three replies were received Manufacturer B stated that his standard for capacity was based on the apothecaries liquid measure of 480 minims to the fluidounce It is assumed that the 480 minims refer to distilled water the equivalent of which is 454 6 grams by weight at 25° C Manufacturer C stated that he arrived at his standard for capacity by using the apothecary ounce of 480 grains of petrolatum It is stated further that "a one-ounce rated container will have a fluid capacity of 1 25 ounces" in terms of this standard Manufacturer D stated his standard for capacity was based on the apothecaries ounce of 480 grains of petrolatum

The results of the second series of tests are presented in Table VIII which follows on page 422

The greatest variation in capacity of the 1/ ounce jars of any one make was observed in those obtained from Manufacturer D Jars 3 and 8 of this manufacturer showed a difference of 19 grains, and the S D was 6 55 grains for the ten jars The next greatest variation in capacity was found in the jars obtained from Manufacturer C Jars 7 and 10 of this manufacturer showed a difference of 15 grains and the S D was 4 79 grains for the ten jars

In the case of the one ounce jars the greatest variation in capacity was observed in those obtained from Manufacturer A Jars 2 and 3 of this manufacturer showed a difference of 19 6 grains and the S D was 5 96 grains for the ten jars

In the case of the two ounce jars the greatest variation in capacity was found in those obtained from Manufacturer B Jars 2 and 5 of this manufacturer showed a difference of 30 4 grains and the S D was 10 25 grains for the ten jars

It is an accepted fact that glass containers cannot be made of exactly the same capacity no matter what method of manufacture is followed or how carefully the work is done The limits observed for variations in capacity, however, were surprisingly narrow, being less than 2 per cent for jars made by any one of the different manufacturers, except in the case of the half-ounce jars made by Manufacturer D

TABLE VIII —CAPACITY OF OINTMENT JARS PURCHASED FROM MANUFACTURERS

Manufacturer	Stated Capacity of Jar	Average Capacity Found for Petrolatum U S P in Grams	Average Capacity in Grains Found by 10 Students										S D in Grains	Percentage Deviation
			Jar 1	Jar 2	Jar 3	Jar 4	Jar 5	Jar 6	Jar 7	Jar 8	Jar 9	Jar 10		
A	½ ounce	201 4	196 7	204 2	206 5	197 5	198 7	205 7	195 4	202 8	204 8	201 9	3 82	1 89
B	½ ounce	199 2	204 2	197 3	201 6	195 7	201 6	196 7	197 4	195 8	204 6	196 8	3 31	1 66
C	½ ounce	258 6	260 2	252 8	260 4	257 0	255 7	266 0	267 4	258 1	255 4	252 5	4 79	1 85
D	½ ounce	240 8	241 4	249 9	250 3	233 8	243 4	248 3	239 2	231 0	235 9	236 2	6 55	2 72
A	1 ounce	408 6	404 9	398 1	417 7	408 3	411 8	408 4	399 2	412 4	414 4	410 5	5 96	1 45
B	1 ounce	423 7	425 6	427 6	424 3	419 4	426 3	424 7	429 1	418 5	424 2	417 4	3 76	0 88
C	1 ounce	447 3	445 5	445 7	448 0	445 9	447 5	445 7	453 5	441 9	453 5	445 5	3 39	0 76
D	1 ounce	478 6	480 2	478 2	482 4	477 2	477 9	477 8	478 7	479 5	477 0	476 7	1 64	0 34
A	2 ounce	805 2	801 7	813 3	794 1	806 3	795 8	809 5	805 8	800 8	812 7	811 7	6 53	0 82
B	2 ounce	748 7	753 7	761 6	757 1	741 7	731 2	731 2	758 9	748 0	753 6	749 5	10 25	1 37
C	2 ounce	937 7	937 6	933 9	942 5	946 7	925 7	932 1	936 9	953 8	928 9	939 1	8 26	0 88
D	2 ounce	982 5	981 0	982 5	989 6	987 2	990 7	979 7	980 3	980 8	983 9	969 5	5 73	0 58

TABLE IX —CAPACITY OF OINTMENT JARS PURCHASED IN RETAIL PHARMACIES

Stated Capacity of Jar	Average Capacity in Grains of Petrolatum Found by 3 Students for Store Number										Av Capacity in Grains for the 10 Stores	S D in Grains	Percentage Deviation
	1	2	3	4	5	6	7	8	9	10			
½ ounce	253	259	241	246	246	224	199	203	212	229	231 2	20 09	8 68
1 ounce	445	446	533	480	459	483	418	410	494	525	469 3	39 31	8 38
2 ounce	947	929	960	810	961	968	799	811	810	841	883 6	70 78	8 01

TABLE X —PERCENTAGE DEVIATION BASED ON AN OUNCE OF 480 GRAINS OF PETROLATUM

Stated Capacity of Jar	Total Number Stores	Percentage Deviation from 480 Grains			
		5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%
½ ounce	10	40%	30%	10%	20%
1 ounce	10	40%	30%	30%	
2 ounce	10	50%	10%	10%	30%

If, however, jars made by different manufacturers are compared, the variation is so great that reasonable limits are exceeded in most cases For instance, if a comparison is made between jar 7 of Manufacturer A and jar 7 of Manufacturer C, a difference of 72 grains will be observed for the so-called 1/2-ounce jar In the case of the one-ounce jars, there was found to be a difference in capacity of 84 3 grains between jar 2 of Manufacturer A and jar 3 of Manufacturer D With respect to the two-ounce jars, there was found to be a difference in capacity of 259 5 grains between jar 5 of Manufacturer B and jar 5 of Manufacturer D The exceedingly wide variation observed for the capacities of these jars is no doubt due mainly to the difference in the standards used by the manufacturers for determining capacity as already pointed out The remedy for this condition is the adoption of a uniform set of standards for use by all manufacturers

VARIATION IN CAPACITY OF OINTMENT JARS PURCHASED FROM RETAIL PHARMACIES

A third series of tests was carried out to determine to what extent ointment jars used in retail pharmacies in the City of Baltimore varied in capacity With this object in view 1/2-ounce, 1-ounce and 2-ounce jars were purchased from two professional pharmacies, two downtown independent pharmacies, three chain stores and three neighborhood pharmacies, and these were tested for capacity as described under the second series of tests, except that the ten jars of each size were each filled by three different students to obtain a fair average for the capacity of the jar instead of ten students as in the preceding tests Petrolatum was used as the base for filling It was poured in the melted condition between 43° and 45° C so as to eliminate any air-pockets that might be formed in packing the solid base The excess was removed by running the edge of a spatula over the top of the jar and wiping off any material adhering to the sides The jars were not weighed until cool

The results of the third series of tests are presented in Table IX, page 422

On comparing the results of the three series of tests, it will be observed that the standard deviation for the 1/2-, 1- and 2-ounce jars is much higher than that of Series one and two In Series two, jars purchased from manufacturers, and in Series three, jars purchased from retail pharmacies, the standard deviation found for the 1/2-ounce drug store jars was about three times that of the greatest deviation observed for jars obtained directly from the manufacturer The standard deviations in the case of the one- and two-ounce jars are about 7 times as great as those of the highest standard deviation observed in the second series of tests

The greatest difference in capacity of any of the one-half-ounce ointment jars purchased from drug stores was 60 grains, for the one-ounce jars 123 grains, for the two ounce jars, 169 grains

For the purpose of making it possible to more readily compare these results with similar data that have been published, but which have not been expressed in terms of the standard deviation, the per cent of deviation from the theoretical, 480 grains to the ounce, has been calculated and is given in Table X, page 422 It will be observed that the margin of error calculated on this basis is 15 per cent for the one-ounce jars and 20 per cent for the one-half and two ounce jars obtained from the ten stores in Baltimore

CONCLUSIONS

1 Petrolatum was the lightest of the four bases studied, followed in order by a 50 per cent lanolin and petrolatum mixture, lanolin and benzoinated lard when packed as received

2 The frequency and magnitude of error are greater in cases where the base is packed in the solid state, than in those where the filling is accomplished by melting and pouring, except for benzoinated lard

3 The capacity of jars by weight is decreased by triturating the ointment base on a slab previous to packing in the solid state

4 The capacity of jars by weight may be decreased or increased by the incorporation of a liquid or a solid with the base, depending on the nature of the liquid or solid and other factors

5 The percentage of error found was in inverse proportion to the size of the jar

6 Jars of a designated size made by a single manufacturer do not vary in capacity beyond reasonable limits There was observed, however, a great variation in the capacity of jars of a designated size made by different manufacturers The latter variation is due largely to the use of different standards by the manufacturers for fixing capacity To overcome this condition it is suggested that uniform standards for fixing standards be adopted by the manufacturers, and that the material taken as the basis for formulating these standards be petrolatum, because of its comparatively low specific gravity and uniformity with respect to other physical properties

7 The results of the tests show that it is impossible for a glass manufacturer to prepare ointment jars which will hold the same quantities by weight of the different ointments dispensed on physicians prescriptions It is believed, however, that it is possible for them to manufacture ointment jars which will hold within reasonable limits definite quantities of petrolatum or other base selected as a standard The pharmacist will then be able to dispense the full quantity of an ointment with a low specific gravity In the case of ointments with a high specific gravity, the filling of the jar may be done in such a manner as to leave a concave surface, thereby preventing the ointment from coming in contact with the top of the jar, and also satisfying the patient as to the fullness of the jar In the case of very heavy ointments, such as mercurial ointments, it will be necessary to weigh off the quantity prescribed and to dispense it in a jar of the size which it will come nearest to filling

8 With regard to the margin of error which may reasonably be expected in dispensing where jars of the same manufacture are used, our observations point to a figure which at the outside is twice the standard deviation, or 25 per cent, for $^1/_2$- and 1-ounce jars, and twice the standard deviation, or 18 per cent, for 2-ounce jars

(To be continued)

A Note on the Arsenic Determination for Reduced Iron " by Margarethe Oakley and John C Krantz Jr —Abstract of Paper, Scientific Section A PH A

A simplified method of treatment for the preparation of ferrous arsenide in reduced iron for the modified Gutzeit test has been devised

DENTAL DRUGS AND PREPARATIONS—ACCEPTED AND NON-ACCEPTED *

BY GEORGE C SCHICKS [1]

The pharmacist has a definite responsibility when creating a demand for his professional service among men of the dental profession

It may be said, without comment, that the pharmacist's first responsibility should be scientific accuracy in compounding prescriptions So closely correlated with this that it can be considered as part of the same responsibility should be the purity and quality of the drugs used

In order to exercise his professional skill, the pharmacist must create a demand for his services Emphasis must be placed—not on the merchandising of packaged products but on the creation of a demand for official products He must fall in line with the campaigners for dental drugs and preparations official in the U S P and N F That campaign is of sufficient importance to warrant having a paper devoted in its entirety to that subject, and does not come within the scope of this paper

Closely related to the professional integrity which must accompany the pharmacist's scientific skill is his responsibility regarding the sale of packaged products

It has been said that there are very few exceptions to the rule that every patented or proprietary preparation is a modification of drugs and preparations official in the U S P and N F This statement should offer a strong argument for pharmacists urging dentists to use official drugs The prescribing of official drugs by the dentist not only permits the pharmacist to engage in the profession for which he was trained but also allows the dentist individuality in writing his prescriptions However, national advertising by manufacturers of packaged products has made the selection, sale and recommendation of such products an important problem to the pharmacist With such a statement in mind let us consider briefly the case of the patent drug manufacturer

I should like to preface my remarks with the statement that I am not waging a campaign against the honest manufacturer of a non-secret preparation with true claims as to its therapeutic action I mean to strike only at the manufacturer of secret remedies and medications with false claims

Before proceeding I should like to make a few simple distinctions between the terms "patent," "secret," ' nostrum ' and "proprietary" remedies

A "patented" medicine in the legal sense is a medicine whose composition or method of making or both have been patented in the United States Patent office or the office of a foreign country Strictly speaking, a "patented" medicine is not a secret, because its composition must appear in the patent specifications and after seventeen years, when the patent expires, it becomes public property A "patent" medicine—patent without the "ed" is generally considered as any medicine of secret composi-

---

* By the American Dental Association

[1] Assistant Dean Rutgers University College of Pharmacy Newark N J

tion which is advertised directly to the public usually for self-medication A "nostrum" is any patented or secret remedy A "proprietary" remedy, according to the Council on Dental Therapeutics of the American Dental Association, is any chemical, drug or similar preparation used in the treatment of disease if such is pro tected against free competition as to name, product, composition or process of manufacture

If the manufacturer of an article wishes to mark it with a distinctive device or brand, if he has that device trade-marked he is protected against anyone using that trade-mark without his permission so long as he makes general use of the trade-mark himself

A common interpretation of the terms "patent" and "proprietary" is summed up in the statement, "all nostrums advertised and sold directly to the public are referred to as 'patent medicines,' those advertised directly only to physicians and dentists are spoken of as 'proprietaries ' "

A pharmacist should not sell, or offer for sale, preparations, the ingredients of which are not known to the medical profession Secrecy concerning ingredients or false claims made for the therapeutic action of the ingredients should immediately condemn the article In this respect the pharmacist can be a most important factor in housecleaning the drug world of at least some of its cure-all venders and thereby increase both the doctor's and layman's confidence in medicaments in general In this respect the pharmacist should feel a definite responsibility to all persons requiring his services

Advertising has become a tremendously powerful weapon to nostrum manu facturers, $70,000,000 a year are spent by the makers and distributors of such medi cines to promote their use Every conceivable method is used to popularize such medicines I do not mean to infer, however, that all products advertised under this $70,000,000 program do not merit the use by and the recommendation of the medi cal and dental professions or the recognition of the pharmacist—but it must be remembered that national advertising does not necessarily guarantee the worth of a product In fact, the present-day maze of extravagant advertising makes it difficult to determine the true merit of a preparation

The American Dental Association has a Council, similar to that of the American Medical Association, which was organized to determine the worth of various drugs and preparations used in dentistry It organized so that men in the dental pro fession could take guess work out of the use of their medicaments and dentifrices The reports of the Council on Dental Therapeutics should be a source of informa tion for the pharmacist The Council determines the therapeutic and scientific usefulness of products manufactured for dental use The organization of that Council is the American Dental Association's attempt to rid its ranks of unscrupu lous manufacturers who have no regard for either science or truth

The American Dental Association is waging a consistent fight against quacks, cure-all venders and manufacturers It is refusing to rent floor space at dental conventions to manufacturers of questionable products, its leading dental journals are refusing to sell advertising space in their journals to manufacturers whose products are fraudulent or worthless In line with its campaign to inform its members of worthless products through the reports of its Council, it has laid down

rigid rules governing the admission of proprietary articles to the list of accepted non-official dental remedies

It would seem that pharmacists should feel the responsibility of working intelligently and cooperatively with the American Dental Association in its campaign against worthless and fraudulent medicaments and dentifrices

The rules of the Council are aimed to assure dental preparations of superior standard and quality Every wide-awake manufacturer of a product of which he is not ashamed will do everything he can to comply with the regulations of the Council If his product does not bear the stamp of acceptance of the Council on Dental Therapeutics and he will not disclose its ingredients, then you should know that there are one or more of the following reasons why his product is not meeting with the requirements of the Council

1 The composition of the product is secret
2 Suitable tests for determining the composition of the product were not furnished the Council
3 The advertising is misleading
4 The claims as to the origin are false
5 The therapeutic claims are unwarranted
6 The product is unscientific and useless
7 The package contains the names of the diseases or of conditions for which the product is used in such a way as to suggest self medication where self medication is probable

Of course a manufacturer may have a product which is useful and represent it truthfully, and may not have applied to the Council for approval Under such conditions ask for information regarding the product from the Council on Dental Therapeutics It would have much more professional significance if a pharmacist inquired of the Council regarding the merits of a product offered for sale by a manufacturer than to have a dentist write to the Council asking for information about a product a pharmacist tried to sell him Such a condition was actually experienced A member of the Dental Council brought the case to my attention urging me to advise pharmacists against recommending secret preparations to members of the dental profession

The Council on Dental Therapeutics asks only that a product have some scientific or therapeutic reason for its existence, that the material does what its makers claim for it, that its advertising is truthful and that it meets the other requirements of the Council as to composition, test and origin That is the basis for my urging pharmacists to make intelligent use of the findings of the Council and be the distributors to the dental profession for only such products as will help perpetuate the dentist's faith in drugs and preparations medicinal

Permission has been granted by the American Dental Association to publish the following list of Accepted and Non-Accepted Drugs and Preparations This list does not contain information concerning all the drugs sent to the Council for consideration, but it is *complete* in so far as the Council has published reports on Accepted or Non-Accepted Preparations to date Subsequent additions will be made to this list as reports are published by the Council Detailed analysis of the preparations and claims may be found by referring to the bibliography after the title of the preparation

ACCEPTABLE PRODUCTS

(All references are to "The Journal of the American Dental Association" The name 'The Journal" is only given in listing of the first product and thereafter omitted in order to condense the Bibliography)

Adrenalin Parke, Davis & Co , Detroit, Mich (*The Journal* 18 (April 1931), 745)

Adrenalin Chloride Solution, Parke Davis & Co , Detroit, Mich 18 (1931), 745

Ampuls Adrenalin Chloride Solution 1 1000, 1 cc Parke, Davis & Co Detroit, Mich , *Ibid*

Ampuls Adrenalin Chloride Solution R 1, 1/10,000 1 cc Parke Davis & Co , Detroit, Mich *Ibid*

Ampuls Adrenalin Chloride Solution R 2, 1 26,000 1 cc , Parke Davis & Co , Detroit, Mich , *Ibid*

Adrenalin Tablets Parke, Davis & Co , Detroit, Mich , *Ibid*

Adrenalin Tablets No 2, Parke Davis & Co , Detroit Mich , *Ibid*

Adrenalin and Cocaine Tablets, Parke, Davis & Co Detroit Mich *Ibid*

Alpha-Naph Co Dental Cream, Carel Labo ratories, Redondo, Calif , 19 (1932), 142

Compound Solution of Alphanaphthol, Care Laboratories Redondo Calif *Ibid*

Ammoniacal Silver Nitrate P N Condit Boston Mass , 18 (1931) 2009

Ampuls Ammoniacal Silver Nitrate, P N Condit Boston, Mass 18 (1931), 2010

Apothesine Parke Davis & Co Detroit, Mich , 18 (1931) 150

Apothesine and Adrenalin Hypodermic Tablets Parke Davis & Co Detroit Mich , 18 (1931) 151

Apothesine and Adrenaline Hypodermic Tablets (R B') Parke, Davis & Co , Detroit Mich , *Ibid*

Apothesine and Adrenalin Hypodermic Tablets, Cylindrical (for pressure Anesthesia), Parke Davis & Co Detroit Mich , *Ibid*

Apothesine Hypodermic Tablets 0 08 Gm , Parke Davis & Co Detroit, Mich , *Ibid*

Apothesine Solution, Parke, Davis & Co Detroit Mich , *Ibid*

Bromethane, Parke Davis & Co Detroit, Mich , 18 (1931) 149

Brometone Capsules 5 grains Parke, Davis & Co Detroit Mich 18 (1931) 150

Bromural E Bilhuber, Inc , Jersey City N J , 18 (1931) 745

Bromural Tablets E Bilhuber, Inc , Jersey City N J 18 (1931), 746

Calglucon, Sandoz Chemical Works, Inc , New York City 18 (1931) 2010

Tablets Calglucon, Sandoz Chemical Works, Inc , New York City, *Ibid*

Calglucon Effervescent Tablets, Sandoz Chemical Works, Inc , New York City, 19 (1932) 142

Mead's Standardized Cod Liver Oil Mead, Johnson & Co , Evansville, Ind 17 (1930) 1942

Mead's Standardized Cod Liver Oil Flavored, Mead, Johnson, & Co Evansville, Ind 17 (1930), 1932

Nason's Palatable Cod Liver Oil Tailby Nason Co , Boston, Mass , 17 (1930) 1942

Parke, Davis & Co 's Cod Liver Oil with Viosterol, 10 D, Parke Davis & Co Detroit Mich 18 (1931), 1787

Parke, Davis & Co , Standardized Cod Liver Oil, Parke Davis & Co , Detroit, Mich , 17 (1930), 1942

Patch's Flavored Cod Liver Oil E L Patch Co Boston, Mass , 17 (1930), 1943

Cod Liver Oil Squibb E R Squibb & Sons New York City 17 (1930), 1942

Squibb's Mint Flavored Cod Liver Oil, E R Squibb & Sons, New York City *Ibid*

Squibb's Cod Liver Oil with Viosterol, 10 D E R Squibb & Sons New York City, 19 (1932) 327

Squibb s Cod Liver with Viosterol, 10 D, Mint Flavored, E R Squibb & Sons New York City *Ibid*

White's Cod Liver Oil Concentrate Health Products Corp Newark N J , 18 (1931) 353

Colgate's Ribbon Dental Cream, Colgate Palmolive Peet Co , Chicago Ill , 17 (1930), 1944

Dentosal Dental Cream, Tage Samsioe, Bos ton, Mass , 18 (1931) 552

Dibromin, Parke Davis & Co , Detroit, Mich 18 (1931) 150

Dibromin Capsules 6 grains Parke Davis & Co , Detroit Mich *Ibid*

Fibrogen Local-Merrell Wm S Merrell Co , Cincinnati, Ohio 19 (1932) 1238

Fibrogen Local Merrell 7 cc vials, Wm S Merrell Co , Cincinnati Ohio *Ibid*

Germicidal Discs of Potassio Mercuric Iodide No 1, Parke Davis & Co , Detroit, Mich , 18 (1931) 152

Germicidal Discs of Potassio Mercuric Iodide No 2 Parke Davis & Co , Detroit Mich *Ibid*

Hyclorite General Laboratories, Madison, Wis , 18 (1931), 1785

Iodent Tooth Paste No 1 Iodent Chemical Co , Detroit, Mich , *Ibid*

Iodent Tooth Paste No 2, Iodent Chemical Co , Detroit, Mich *Ibid*

Maltine with Cod Liver Oil, Maltine Co Brooklyn N Y , 18 (1931) 2411

Naboc Tooth Powder, Naboc Company New York City, 18 (1931) 2011

Neo-Silvol Parke Davis & Co , Detroit Mich , 19 (1932), 508

Plough's Tooth Paste Plough Inc , Memphis, Tenn *Ibid*

Procaine Epinephrine Billets—Novol Novocol Chemical Co , Brooklyn N Y 18 (1931) 2412

Procaine Epinephrine Solution—Anestubes Novocol Chemical Co Brooklyn N Y 18 (1931), 2411

Procaine Epinephrine Tablets (Novol) Novocol Chemical Co Brooklyn N Y 19 (1932) 682

Procaine Epinephrine Tablets No 1 Novocol Chemical Co Brooklyn N Y *Ibid*

Procaine Epinephrine Tablets, No 2 Novocol Chemical Co , Brooklyn N Y *Ibid*

Procaine-Epinephrine Tablets, No 5 Novocol Chemical Co , Brooklyn N Y , 19 (1932) 682

Procaine Epinephrine Tablets No 6 Novocol Chemical Co , Brooklyn N Y , *Ibid*

Procaine Epinephrine Tablets No 10 Novocol Chemical Co Brooklyn N Y *Ibid*

Procaine-Epinephrine Tablets, No 12 Novocol Chemical Co Brooklyn, N Y , *Ibid*

Procaine Solution—Anestubes Novocol Chemical Co , Brooklyn, N Y 18 (1931) 2411

Procaine Tablets No 4 (Novol) Novocol Chemical Co , Brooklyn, N Y 19 (1932) 682

Pyridium, Merck & Co , New York City, 19 (1932), 1045

Aqueous Solution of Pyridium Merck & Co , New York City, 19 (1932), 1046

Pyridium Ointment, 10 per cent Merck & Co , New York City, *Ibid*

Pyridium Tablets 0 1 Gm , Merck & Co New York City, *Ibid*

Silver Nitrate Applicators, Arzol Chemical Co , Nyack, N Y 18 (1931), 2412

Silvol Parke, Davis & Co , Detroit, Mich 19 (1932) 508

Arm & Hammer Brand of Sodium Bicarbonate Church & Dwight Co Inc New York City, 18 (1931), 746

Sodium Perborate Flavored—Merck, Merck & Co , New York City, 18 (1931) 2011

Thromboplastin Local—Squibb E R Squibb & Sons, New York City, 19 (1932), 326

Trichloroethylene—Calco, Calco Chemical Co Inc Bound Brook N J 19 (1932), 682

Parke-Davis & Co s Viosterol in Oil 250 D, Parke, Davis & Co Detroit Mich 18 (1931), 1787

Viosterol in Oil 250 D, Squibb E R Squibb & Sons New York City, 19 (1932), 327

Ephraim Dental Cream, Jerome W Ephraim, Inc , New York 19 (1932), 1633

Zanol Tooth Paste The American Products Co , Cincinnati, O *Ibid*

Sodium Perborate, Flavored Hennen, Hennen Products, Wheeling W Va , 19 (1932), 2024

Hennen's Tooth Powder, Hennen Products Wheeling W Va , *Ibid*

Parke, Davis Haliver Oil with Viosterol—250 D Parke Davis & Co Detroit, Mich 20 (1933) 151

Soluble Gelatin Capsules, Parke Davis Haliver Oil with Viosterol—250 D, 3 minims Parke, Davis & Co Detroit, Mich , 20 (1933), 151

Pycope Tooth Powder Pycope, Inc , Joplin Mo , 20 (1933), 152

Haliver Oil with Viosterol 250-D—Abbott Laboratories, North Chicago Ill , 20 (1933), 723

Soluble Gelatin Capsules Haliver Oil with Viosterol 250 D—Abbott 4 mm Abbott Laboratories North Chicago Ill , *Ibid*

Ward's Tooth Paste, Montgomery Ward & Co , Chicago, Ill , 20 (1933) 724

Lactona Dentifrice Lactona, Inc St Paul Minn , *Ibid*

PRODUCTS NOT ACCEPTED

(Including products for which the Food and Drug Administration of the U S Dept of Agriculture has issued Notices of Judgment)

No 7 Alkaline and Antiseptic Tablets John Wyeth & Bro (Inc), Philadelphia, Pa 19 (1932) 1053

Anacin The Anacin Co Chicago Ill , 16 (1929) 1121

Antiphlogistine, The Denver Chemical Mfg Co New York, 16 (1929), 1517

Anti Pyor Mouth Wash Sharp & Dohme, Inc Philadelphia, Pa 19 (1932), 1056

Atomidine, Schieffelin & Co , New York, 16 (1929) 168

Dr Bell s Guaranteed Pyorrhea Remedy

Rankin Bell Laboratories, San Francisco, Calif , 19 (1932), 143

BiSoDoL BiSoDoL Co , New Haven, Conn , 19 (1932), 1427

Calsodent, Calsodent Co , New York, 19 (1932) 513

Campho Phenique The Campho-Phenique Co St Louis Mo 19 (1932) 510

Cato Anti Pyorrhea Tooth Paste Cato Chemical Co , St Louis Mo 19 (1932) 1055

Chlorax, Chlorine Products Co , Primos, Pa , *Ibid*

Dar Ling Oil, Hemlock Oil Co , Derry, N H , 17 (1930) 1356

Sherman L Davis Treatment, Ucoline Products Co , Chicago Ill 17 (1930), 1744

Dentinol, Dentinol & Pyrozide Co , New York, 19 (1932) 866

El Be Oral Mouth Wash, Whitman Pharmacy Camden, N J 19 (1932), 686

Dr Ellis' F E I Tooth Paste, F E I Corporation Pittsburgh Pa 18 (1931) 2416

Emedent Dr C S Williams Ellisville, Miss 17 (1930) 1945

Emedent Pyorrhea Mouth Wash No 1 Dr C S Williams, Ellisville, Miss 19 (1932), 686

Epicol, Epicol Products Co Minneapolis, Minn , 16 (1929) 1320, and 18 (1931), 2416

Ercolin Smith Ernster Laboratories, Inc New York 16 (1929) 2301

Ex-Cel Tooth Stain Remover, L Silverman, Philadelphia Pa , 18 (1931), 356

Fayro, Fayro Laboratories, Inc Pittsburgh Pa 16 (1929) 2301

F E I Solution, F E I Corporation Pittsburgh Pa 18 (1931) 2416

Foresite Dental Preparation, Foresite Mfg Co , Minneapolis Minn 17 (1930) 1357

Forhan's for the Gums The Forhan Company New York 18 (1931), 548

Forhan's Pyorrhea Astringent, The Forhan Company New York 16 (1929), 1940

Gilbert's Oral Antiseptic Gilbert Products Corporation Morristown N J , 19 (1932), 1053

Gum Rub Gum Rub Inc , Washington D C *Ibid*

Dr Hand s Teething Lotion Hand Medicine Co Philadelphia Pa , 19 (1932) 330

Dr Hubbel's Formula Hubbel Products Co , Boston, Mass 18 (1931) 2014, and 19 (1932) 332

Dr Huff s Combination Tooth Powder and Mouth Wash Huff s Tooth Powder Company Hot Springs National Park, Arkansas 19 (1932) 1057

Kemozone, Kemozone, Inc , Long Island City, New York, 17 (1930), 2303

Kolynos Dental Cream, Kolynos Co , New Haven, Conn , 19 (1932), 328

Kramer's Original Charcoal Dental Cream Modern Products, Inc , Jackson Miss , 19 (1932), 868

Lavita, Lavita Company, Waterloo, Iowa 17 (1930), 175

Lavodent, Lavodent Research Laboratories Inc , Philadelphia Pa , 19 (1932), 1056

Lesser Slim Figure Bath, The Lesser Co , 16 (1929), 2300

Lorty Antiseptic Tooth Paste, B F Allen Co , New York, 19 (1932) 686

Luebert's Nox'Em Pain Tablets, A Gustav Luebert, Coatesville, Pa , 19 (1932), 1056

Lu Ora, Stevens Luke Co , Thomasville, Ga 19 (1932) 1053

Marmola, Marmola Co , 16 (1929), 2301

McArthur's Dental Massage and Oral Hygiene, Oral Research Laboratories, Detroit Mich , 19 (1932), 870

Mico Pyorrhea Solutions, Mico Laboratories St Paul, Minn , 18 (1931), 1791

Mosso's Oil of Salt C A Mosso Laboratories Chicago, Ill , 18 (1931), 2416

Mu Sol-Dent, V B Corporation, Pittsburgh Pa 15 (1928), 1977

Nasene, Clayton Laboratories, Washington, D C , 18 (1931), 146

Neu Ora Contact Anesthetic Neu Ora Co , Inc , Seattle, Wash , 19 (1932), 1430

Neuro Nerve Powders, Neuro Chemical Co West Brighton, N Y , 17 (1930), 1357

New Mix Dental Cream, Gilmont Products, New York, 18 (1931), 148

Ora Noid, Ora-Noid Company Chicago, Ill 16 (1929), 554

Painallay, The Painallay Co Kansas City Mo , 19 (1932), 1055

Pearlo Tooth Powder, M E Schmidt, Columbus, Ohio 18 (1931), 146

Pebeco Tooth Paste, Lehn & Fink, Inc , Bloomfield N J , 20 (1933), 2248

Perdentin, Perdentin Laboratories, New York, 17 (1930), 530

Dr A Peters Tuberosum Pyorrhea Treatment, Tuberosum Pyorrhea Co Broken Bow, Oklahoma 19 (1932) 1054

Phennol, Phenol Laboratories, Chicago, Ill 17 (1930), 917

Dr Pirtle's Germ Oil, Germ Oil Co Jonestown Miss , 19 (1932) 1054

Pyo Rem and Pyo Rem Dental Cream Pyo

Rem Chemical Co , Los Angeles, Calif , 18 (1931), 2418

Pyor Chloride, Lindsey Laboratories, Santa Barbara, Calif , 19 (1932), 1636

Pyor-Heal, The Brander Co , New York 19 (1932), 686

Pyradium, Radium Remedies Co , Minneapolis, Minn , 19 (1932), 1056

Pyros, Pyros Co , Denver Colo , 17 (1930), 2303, and 19 (1932), 1052

Pyro Sana Tooth Paste, Alhosan Chemical Co St Louis, Mo 19 (1932), 1054

Pyrozide Dentinol & Pyrozide Co , New York 19 (1932), 866

Radithor, Bailey Radium Laboratories, Inc , East Orange, N J , 16 (1929) 2139

Reduc-It, Denver Research Laboratory, Denver, Colo , 16 (1929), 2301

Salicon K A Hughes Co Boston Mass , 17 (1930) 1357

Sedafen, Sedafen Products Co , Springfield, Ohio 17 (1930), 1356

Sed A Rex, Epicol Products Company, Minneapolis, Minn , 19 (1932), 1638

Sedormid, Hoffmann-LaRoche Inc , Nutley, N J , 19 (1932), 863

Semafor, Indicator Laboratories, Chicago, Ill , 15 (1928), 2357

Sensitex, King's Specialty Co Ft Wayne, Ind 19 (1932), 2196

Smith's King of All Pain and Tex A Tine Ointment, Texatine Medicine Co , Enid Okla , 19 (1932) 686

Sodibor, Sodibor Laboratories White Plains, N Y , 19 (1932) 867

Somnoform, Stratford Cookson Co , Philadelphia, Pa , 18 (1931), 2412

Sozodont Liquid, Block Drug Co Brooklyn, N Y , 19 (1932), 1054

Squibb Dental Cream, E R Squibb & Sons, New York City, 20 (1933), 2248

Dr Strasska's Tooth Paste Dr Johan Strasska Laboratories, Los Angeles Calif , 19 (1932), 2200

Stypstringant, Lawrence Chemical Co , Atlanta, Ga , 19 (1932), 1053

Subidin and Myodine, I-O Dine Laboratories, Inc , Philadelphia, Pa , 19 (1932), 1633

Tartaroff, Tartaroff Company, Chicago, Ill , 15 (1928) 2167, and 17 (1930) 344

Tricho System, Albert C Geyser, New York, 16 (1929), 2300

Vacher's Antiacid Dentifrice E W Vacher, New Orleans, La 18 (1931), 147

Vident No 4 Powder for Riggs' Disease and Vident No 6 Riggs' Disease Mouth Wash Katz & Besthoff, New Orleans, La , 19 (1932) 1052

Wag's Salve, Wag's Chemical Co (Inc) Knoxville Tenn , 17 (1930) 1356

Dr E A Welter's Antiseptic Tooth Powder E A Welter's Tooth Powder Co Jacksonville Fla , 19 (1932), 1055

X It, X-It Laboratories Inc , New York 16 (1929), 365

Zi O Dine Dental Cream, Iodine Products Co , Laurel, Miss , 19 (1932), 686

Fantazn No 1 Fantazn Laboratories, Los Angeles Calif 20 (1933), 1526

Pals Improved Reducible Silver, Dr B L Paley, Brooklyn, N Y 20 (1933), 1528

Pals Improved Aconite and Iodine, Dr B L Paley, Brooklyn, N Y , *Ibid*

Pals Benzocaine Compound Dr B L Paley, Brooklyn N Y 20 (1933), 1529

Pals Gum Balsam, Dr B L Paley, Brooklyn N Y , *Ibid*

Pals Pyorrhea Astringent No 1, Dr B L Paley Brooklyn, N Y , 20 (1933), 1530

Pals Pyorrhea Astringent No 2, Dr B L Paley, Brooklyn, N Y , 20 (1933), 1531

Pals Surgical Powder, Dr B L Paley, Brooklyn, N Y , *Ibid*

Styptysate, Ernst Bischoff Company, New York City, 20 (1933) 1532

ALCHEMICAL SYMBOLS *

BY J HAMPTON HOCH

Alchemy, the precursor of chemistry, is of interest to the pharmacist because, inasmuch as it has affected the science of chemistry, it has influenced pharmacy Some small remnant of alchemical terminology is still to be encountered in pharmaceutical synonyms, e g , water of Saturn, lunar caustic, crocus Martis, etc , and

* Section on Historical Pharmacy, A PH A Toronto meeting 1932

our present method of abbreviating the chemical elements is derived from alchemy through Geoffroy, Bergman, Dalton and Berzelius When viewed in the light of their remote antiquity, many of the symbols used by the mediæval alchemists were but modern applications of ancient ideographs

When and where the "royal art" originated is not certainly known Egypt is generally considered the birthplace of chemistry, or, to be more exact, of experimental alchemy The Land of Chem (or Cham), as Egypt was called, is the root of our word "chemistry"[1] and the Arabic article "al" prefixed to the same root gives us the word for the "black art" Egyptian priests were known to be adepts in certain chemical arts, and, during the later dynasties, their temples occasionally had laboratories attached

Frequently overlooked in the discussion of the history of alchemy is the fact that it originated as a philosophical system, "an attempt to apply, in a certain manner, the principles of Mysticism to the things of the physical plane" The experimental development of the philosophy is coeval with the beginnings of the science of chemistry The abstract teachings of the art are buried in a mass of figurative and symbolic terminology for the purpose of shielding the esoteric instructions from the eyes of the vulgar and profane, for the adepts considered a knowledge of their secrets dangerous for the generality of people,[2] and then, too, their free doctrine was at variance with established religion

Because of the liaison between alchemy of the spirit and alchemy of matter, the mystical and symbolic expressions of the former were perpetuated in the latter In any attempt to discover the origin and trace the development of the various symbols and curious designs with which later alchemistic writings are embellished, we must push back through the mists of antiquity, back to the beginnings of a written language, and even earlier, to the time when man first acquired an intellectual interest in the firmament

The usual coupling of the metals and planets leads directly to astronomy, the earliest of the sciences Astrology, which chronologically precedes astronomy, arose from man's interpretation of the changes of the celestial bodies as tokens of good-will or enmity, of favor or displeasure of the gods What primitive man did not understand he feared, and there was much that he did not understand Contemplation of the heavens and the realization that their phenomena intimately concern man and all nature placed them in the category of Ultimate Causes The personification and deification of the sun and moon are older than any written records, the worship of the stars was usually subordinated to the "King and Queen of the heavens"

The worship of earth, air, fire and water sprang from fetichism, and primitive religions passed the worship of these elements down to the Sumerian and Egyptian civilizations, where this worship became a part of the religious system Every

---

[1] First use of the term is found in the writings of Zosimus of Panopolis, in Upper Egypt (3rd–4th century)

[2] Philon the Jew (*c* 20 B C –40 A D) in "De Vita Mosis" particularizing the sciences which Moses studied in Egypt mentions Symbolic Philosophy (written in sacred characters) which the Greeks had heard came from the Assyrians who transmitted the art of letters and the Chaldeans who understood the science of the stars

phase of nature was, over the course of centuries, provided with a special guardian and controlling deity

The Greek philosopher, Empedocles of Agrigent (*c* 440 B C), considered fire, air, water and earth (deified as Zeus, Hera, Nestis and Aidoneus) to be the four elements, a fifth, "ether," was added by Aristotle "These elements were regarded not as different kinds of matter, but rather as different forms of the one original matter, whereby it manifested different properties" The two alchemistic principles generally called "man and woman, red and white, sun and moon, sulphur and mercury," were likewise regarded as properties rather than as substances "Salt" was later added by Paracelsus as a third elementary principle

The blending of cosmogonic and religious ideas was well advanced in Babylonia as far back as thirty-five centuries before our era, when specific deities were connected with the sun, moon and planets [1] The further development of Babylonian astrological views, chiefly under Greek influence, led to the idea that each of the seven metals was under the influence of one of the seven planets, and this idea culminated in the Ptolemaic system which endeavored to bring all the known sciences within the scope of astrology Thereupon the tendency to use the names or astronomical symbols of the planets for their respective metals followed quite naturally

The human mind is so constituted that it craves symbols for the representation of its ideas and principles, and this tendency was particularly strong in the peoples of the East In the astronomical signs for the sun, moon, planets and zodiac we have symbols representing, directly or metaphorically, by form or significance, the objects intended In the following sections we shall attempt to show how the various symbols for the metals came to be used in their respective forms

Gold is represented as a circle with or without a point at its center This symbol is the divine circle associated with the sun The ancient Sumerians worshipped a sun-god whom they called Utu or Babbar Their earliest symbol for this deity was  , later (about 2400 B C) modified to  which was as close as they could approximate a circle with cuneiform writing This sun-worship penetrated prehistoric Egypt, where it became the main religion of the early kings, as early as 3100 B C, imposing itself on a substratum of totemism Ra, the sun-god, was designated by the divine circle in the hieroglyphics of the Egyptians,[2] clearly a personification of the physical sun as was also the Babylonian Shamash, the Greek Helios, the Latin Sol Identification of Ra with those local deities which he did not supplant resulted in many titles being given to the sun-god [3] The desire of the ancient rulers to be considered divine gave rise to the king-sun

[1] The astronomer priests noting the number of planetary bodies came to ascribe a particular sacredness to the number seven, and the seven planetary deities held a place of peculiar consequence amid the spirits of heaven and earth in Mesopotamia

[2] Breasted says that the most ancient symbol of the sun god was a pyramid Amenhotep IV (*c* 1370 B C) gave a new name and symbol to the sun a disc with rays

[3] Theocrasia was very prevalent in Egypt The worship of Ra was grafted onto that of Atmu (Tem) while Osiris and Heru neb (the golden Horus) and Amen and Chnum and Aton were all fused at different times with the sun deity

idea and the sun was frequently referred to as "noble," "king," "lord" Although a female goddess at first, masculine attributes very early supplanted the feminine ones which were then assigned to the moon The inherent color of gold was likened to the sun, which was described as "golden-eyed," "golden-tongued," "golden handed," etc The hieroglyph[1] for the metal gold  itself is a simplified form of the winged-disc, a flying-sun deity (Horus) of Upper Egypt

The Greeks distinguished between physical light and mental illumination—a distinction which placed Helios on one side and Phoebus Apollo on the other Helios is represented with the solar disc and rays behind his head in an ancient Trojan relief, while Apollo hurling his disc alludes to the course of the sun through the sky

The old Roman family of the Aurelii were believed by the ancients to have taken their name from the sun, their family deity [3] Although occupying an insignificant part in the religion of the ancient Romans, sun-worship, introduced from the East, received imperial patronage in the first century before our era and spread throughout the empire, where Strabo says the Persian god Mithra was worshipped under the title of the Unconquered Sun The Roman gods Sol and Apollo were both sun-gods, neither more sharply distinguished from each other than the Greek Helios and Apollo

The character for silver is a semicircle or a crescent The gradual waxing and waning of the moon to the primitive mind was personified by woman, and the ancient moon goddesses were mostly mother-deities, spouses of the sun [4] The Assyrian Sin and Egyptian Isis (especially in later times) were linked with the moon The symbol of Sin was a crescent moon, a moon was the head dress of Isis, the Queen of Heaven, to which the horns of the cow-goddess Hathor (Het heru) were added after the fusion of the two deities The hieroglyph for silver  * was a combination of "het" ( -white) and "nub" (gold)

As goddesses of the moon, the Grecian Selene and Artemis stood in the same relation to each other as Helios did to Phoebus Apollo Selene is figured with a half-moon on her brow, or less frequently with horns

---

* Chaucer in Chanones Yemanne s Tale says

Sol gold is, and Luna silver we threpe,
Mars iren Mercurie silver we clepe
Saturnus led, and Jupiter is tin,
And Venus coper, by my faderkin "

The sequence found in the old cuneiform literature of Babylonia is Sun, Moon Jupiter (tin) Venus, Saturn, Mercury, Mars

[1] Assyrian monuments show the sun represented as a disc with long wings similar to the Egyptian hieroglyph

* The author corrects symbols for gold and silver in saying that the dots should be open circles —*Editor*

[3] The Latin aurum ' apparently derives from the name of this family which Frazer says should be Auselii since the old Sabine name for the sun was ausel "

[4] The old Babylonian moon god Nannar (Enzu), worshipped at Ur was masculine

The second most precious metal was naturally associated with the moon, wife of the golden sun, since the color of her lustrous beams was very like this metal The silvery moon was as much the theme of the ancient poets' lays as it is the motif of modern songsters

Tin is symbolized by the sign of Jupiter ♃ Some have suggested that this symbol represents Jove's thunderbolt, others that it is a modified form of the Greek zeta, the first letter of Zeus s name We are inclined to a much earlier derivation

The Roman sky-god, Jupiter (from Zeus pater), and his Grecian counterpart were omnipresent and beneficent deities, controlling all the heavenly phenomena In Egypt the local god of Thebes, Ammon (Amen), had been raised to the first position in the pantheon, where, as Amen-Ra, he was regularly called "King of the Gods and Lord of the Throne " The ram was sacred to Amen and his head-dress is represented with the roundly curved ram's horn The combination of the curved horn and the scepter of the god gives us the character for the sky-god

In the Sumero-Accadian pantheon we find Marduk associated with the planet Jupiter, and although he, too, was called "King of the Heavens," we can adduce no symbol similar to that used for tin

The symbol for copper, a circle with a cross beneath, is the planetary sign of Venus According to Bailly, the mirror of the Roman goddess of love and beauty is the source of this symbol Since the worship of Venus was not general in Rome until later times, an earlier derivation is indicated

One of the most celebrated shrines of the ancient world was the temple of Aphrodite, at Paphos in Cyprus This Grecian goddess of love—the love thought to be the cause of productiveness—was intimately associated with the island of Cyprus[1] whose rich copper mines were early exploited by the Phœnicians In fact, the Phœnician Astarte was the transplanted source of Aphrodite[2] The Phœnicians, in turn, had adopted the Babylonian mother-goddess, Ishtar, who embodied the reproductive energies of nature, and who had been identified by the Babylonian astronomers with the planet Venus

The Egyptian hieroglyph for copper bears no resemblance to any of the symbols or attributes of the mother-goddess, but the ankh or crux ansata, the symbol of life, is extraordinarily like the symbol for copper This "cross with a handle," borne by almost every Egyptian divinity, represents the male triad and the female unit and is a likely character to associate with the great goddess of fertility

Lead is characterized by a sickle, the sacred emblem of Saturn The association of the scythe with the precursor of Saturn, the Grecian god Kronos, is well known We could elicit no similar emblem from Egyptian or Babylonian deities connected with this planet and, therefore, incline to the belief that the association of this symbol with the planet Saturn does not antedate the Greeks

Mercury is symbolically represented by a circle, joined to a crescent above and a cross beneath Some have claimed that this character represents the caduceus which Mercury carried in his hand in his flying embassies for the gods Mer-

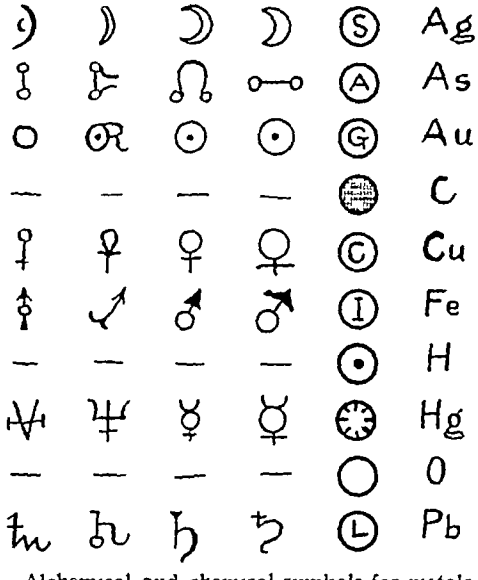
[1] The word cuprum is derived from the name of this island

[2] Lucian identifies her with Selene the moon goddess and with the planet Venus

cury, or Hermes as he was known to the Greeks, undoubtedly was derived from the Egyptian god Thoth (Tehuti) [1] As a "power from heaven," Thoth represented the divine intelligence, the scribe of the gods, and was the inventor of all the arts and sciences Among the emblems associated with this deity, the combined disc and crescent is used to express certain phases of his character, and we think the probable source of the emblem for "argentum vivum" is the combination of the ankh and the crescent

The "hermetic' books attributed to Thoth have their counterpart in the "Wisdom of Nebo," a set of tablets in the royal library of Nineveh, attributed to Nebo (Nabu), the Chaldean god presiding over knowledge and intelligence, the scribe of the gods, the originator of writing The symbol of Nebo, however, does not resemble the symbol of Thoth

Symbols for Metals *



Alchemical and chemical symbols for metals The first three are in sequence of the 15th, 16th and 17th Centuries The next three 1783, Bergmon, 1808, Dalton, 1814 Berzelius—from Ingo W D Hackh—"A Chemical Dictionary "

The character used to represent iron is derived from the shield and spear of the Roman god, Mars, who, as the god of war, was naturally furnished with the two most common instruments of war The fiery aspect of the planet Mars corresponds well with the bloody character of the deity by whose name it is distinguished The Grecian counterpart of Mars, called Ares, was also represented with the shield and spear Although we can adduce numerous connections between the planet Mars and the war gods of ancient peoples, we know of no definite symbolism of spear and shield antedating the Greeks

The literature of alchemy during the early centuries of our era is very scanty The Roman emperor Diocletian decreed (292 A D) the destruction of all the books of the alchemists, fearing that the opulence of the Egyptians would make them less tractable to imperial demands Copyists of Syrian and Moslem academies managed to preserve for us a few of the writings, the Moslems being the continuers of the Hellenistic tradition and the initiators of medieval alchemy Translations, introduced into Western Europe through Moslem Spain during the 12th and 13th centuries, furnished the soil from which the extensive alchemical literature of the succeeding centuries flowered The use of symbols passed from the Greeks to the Syrians but not to the Moslems, who had a religious objection to figures or drawings of objects as tending to idolatry Symbols first found their way into medieval European writings on alchemy about the 15th century through Greek copies of the

[1] The ancient Greeks adopted most of their theology and mythology from the Egyptians

* See page 434

Syrian works Distortions and mutilations had crept into the copies during the passage of time and because of repeated transcriptions The obligation of secrecy continued to be stressed,[1] and symbols and secret names finally became legion

The various symbols underwent very little change during their transmission through the centuries, although new characters were devised to represent the ever-increasing number of substances with which the "pseudo-alchemists" experimented in their search for the "elixir" and the ' stone " These symbols were a convenient shorthand system at a period when caligraphy was little employed, and so the muddle of arbitrary figures wriggled and twisted over the pages of pharmaceutical and chemical writings down to the 19th century, when they were replaced by our present method of abbreviation

REFERENCES

Bailly, Histoire de l Astronomie Ancienne (1781)
Bayley 'Lost Language of Symbolism (1912)
Breasted 'Development of Religion and Thought in Ancient Egypt" (1912)
Brown ' History of Chemistry' (1920)
Budge, 'The Book of the Dead" (1913)
Eichler, 'Customs of Mankind (1924)
Frazer, "Worship of Nature' (1926)
Hopkins, 'A Modern Theory of Alchemy"—address before Amer Chem Soc (1924)
Inman, Ancient Pagan and Modern Christian Symbolism ' (1922)
LaWall, Four Thousand Years of Pharmacy (1927)
LeClerc Histoire de la Medecine ' (1729)
Mason, A History of the Art of Writing' (1920)
Murray ' Manual of Mythology" (1895)
Pearson Chemical Nomenclature' (1799)
Peet, Cambridge Ancient History' (1924)
Peters, 'Aus pharmazeutischer Vorzeit in Bild und Wort' (1891)
Peters "Pictorial History of Ancient Pharmacy' —translated by Netter (1889)
Petrie, 'Religious Life in Ancient Egypt (1924)
Redfield ' Gods—A Dictionary of the Deities of All Lands" (1931)
Redgrove ' Alchemy Ancient and Modern' (1922)
Sarton ' Introduction to the History of Science' (1927, 1931)
Schultze Fetichism" (1885)
Silberer, Problems of Mysticism and Symbolism '—translated by Jelliffe (1917)
Thompson, ' Mystery and Romance of Alchemy and Pharmacy ' (1897)
Thorpe, History of Chemistry' (1909)
Wall, "Tract on Symbols ' (1783)
Williams, 'The Great Astronomers" (1930)
Wynne 'Mysticism and Symbolism in Relation to the History of Medicine"—J Ind Med Assoc (1922)
"Encyclopedia Britannica" (1910)
' New International Encyclopedia" (1914)

[1] The hermetic philosophers continued to write in figures of speech and with symbols because they feared the persecution of the Church Augustine began the war on symbolic language, the use of which he declared was a characteristic of the Gnostics and from 325 A D on, every departure from the beliefs of the state church was considered a state offense Pope John XXII, in the 14th century, issued a strong bull against the hermetic art as devil's work The 15th century saw local decrees against alchemy in Venice and Nuremburg, also by the English Parliament

ADDRESS OF THE PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

BY ROBERT L SWAIN

Due to an unusual spirit of forbearance, the address of the president has become one of the time-honored customs of these annual meetings And, relying upon a continuance of your good nature, I am happy to conform to the custom to-night But first, let me admit my indebtedness to that line of fine men who have preceded me in this high office I confess freely that much of the inspiration which has come to me is the result of an interested and diligent study of their distinguished work Nowhere is there to be found evidence of a higher ideal, a more earnest and practical point of view or a more consistent purpose than in the presidential addresses delivered before this body As I look back upon this great mass of constructive material, I can only venture the hope that I have measured up, as best I could, to the high standard they long ago set up

R L SWAIN

One of the very first things the president of this ASSOCIATION faces is the vast responsibility which he must carry To be compelled to pass judgment, to make decisions, and to take a real part in working out policies and problems is vastly different from sitting in idle contemplation on the passing scene No president, I am sure, ever sought to shirk his responsibility I, in my own way, have attempted to face mine

As I look back over the eight months of my term of office, I am certain that some worthwhile things have been done I am conscious that I have approached my problems in my own way I am aware that I have seen the office through my own eyes In other words, there is such a thing as the presidential interpretation of the presidency

This address, then, is my interpretation of the presidency I want to emphasize that I am expressing my own views I am submitting personal evaluations and interpretations of the many things which have demanded my attention I stress the personal nature of this address so that the ASSOCIATION may be completely free to act as it seems best regarding the proposals I advance or the suggestions I submit The ASSOCIATION is fully absolved from any collusion or collaboration in these respects

For these reasons, I shall make no attempt to give you a detailed statement of the general work the ASSOCIATION has carried on Fortunately, much of this is done year in and year out with little thought to the one then holding the presidential chair This work is peculiarly and preeminently the work of the secretary and he should present it I have purposely sought not to infringe upon his field It is to the secretary that we should look for portrayal of the ASSOCIATION year, and for an analysis or interpretation of the work carried on The secretary's

report should be printed in advance of the meeting, and be made an outstanding feature of the annual program

At the outset of this address, I desire to express my real devotion to the principles which have actuated the AMERICAN PHARMACEUTICAL ASSOCIATION since its inception A high note was sounded at the very beginning Within their sphere and for the fulfilment of their purpose, the great Constitution and Code of Ethics formulated at the first meeting of the ASSOCIATION in 1852 stand with the finest expressions of professional opinion to be found anywhere Even at this late day, they challenge our admiration, and impel us to renewed devotion Throughout its history, the ASSOCIATION has been steadfast in its adherence to sound ideals Petty politics have not crept in, self-seeking has not asserted itself, and nothing has been able to entice it away from the early precepts It stands to day as the embodiment of sound thinking, unselfish leadership, and as pointing the direction in which pharmacy might safely move In spite of the changes which have come about on all sides, and in spite, too, of the uncertainty and confusion of the moment, the ASSOCIATION should continue its efforts to advance pharmacy as an essential public health profession The ASSOCIATION is faced with a magnificent destiny The future of pharmacy may well be said to rest upon its integrity To-day the AMERICAN PHARMACEUTICAL ASSOCIATION has become recognized as a national, non-profit, professional body of pharmacists, pharmaceutical educators, law-enforcement officials, research workers, and others interested in the protection of public health and the treatment of disease It is my earnest hope that its activities may be confined to the fulfilment of these high and inspiring purposes

This meeting of the ASSOCIATION will long be remembered as one of great historic significance The center of the stage is held by the American Institute of Pharmacy, as the headquarters building of the ASSOCIATION has been so rightfully named The dedication exercises, to be observed to-morrow, mark the close of one important phase of this great undertaking This magnificent building, a real epic in marble, represents one of the most important accomplishments of our profession It typifies, in a peculiarly beautiful manner, the highest ideals of pharmaceutical efforts It proclaims, in wondrously pleasing notes, the meaning of the service which pharmacy carries on It stands, as it will long continue to stand, a classic tribute to those who have seen beyond the confusion of the moment to the deep cool pools from which come intrinsic and lasting things

While the dedicatory services are not to be anticipated at this time, I do want to point out the necessity of using the building as a real pharmaceutical workshop A magnificent plant has been provided, and is now ready for the best possible use Every group, devoted to the professional advancement of pharmacy, should center its activities here No more fitting place can be found for the offices of the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy The work which they do is closely connected with the basic purposes of the AMERICAN PHARMACEUTICAL ASSOCIATION These two organizations would immediately find themselves more closely in touch with national thought They would become, in every sense of the word, the national authorities in their respective fields

Not only should these two great groups be brought in, but there are many other activities which the ASSOCIATION should inaugurate as promptly as possible There is an urgent demand for additional publications Surveys and special professional and economic studies await only the facilities with which to proceed Statistical, legislative and legal departments should be set up Research studies bearing upon the United States Pharmacopœia and National Formulary should be provided for The drug industry should look here for the establishment of drug standards, and for working out the important technical and scientific bases upon which they rest With these functions in full swing, little would be needed to make this building a practical and effective pharmaceutical institution

It is recognized, of course, that any such program requires funds When the building project was first launched, the objective was one million dollars The half-way mark has been nobly reached There remains the second, and perhaps equally important part Adequate financial support must be forthcoming if the ASSOCIATION is to carry out its magnificent plans, and do the job that must be done With this thought in mind, I recommend that the Committees on Campaign Funds, Site, and Plans for the A PH A Headquarters Building be discontinued, and that a new committee be set up to consolidate the work done so far and to push on to the ultimate objective I would suggest that the title be the American Institute of Pharmacy Maintenance Committee This committee should be empowered to undertake the collection of funds for the maintenance and development of the ASSOCIATION'S activities so that the best use may be made of the facilities now enjoyed

I further recommend that Doctor H A B Dunning, chairman of the present Campaign Fund Committee, be asked to assume the chairmanship of the Maintenance Committee No one knows more than I the great load he has carried, and the fine job he has done Under other circumstances, I should feel that he has earned the right to retire However, as great as has been the success of his labors, I believe a larger opportunity awaits him Without his judgment, his faith, his idealism, it is certain that the headquarters building would not have been so promptly realized With his great talents placed behind this final phase of the job, I am sure it will be brought to a successful conclusion

I should like to pay my personal tribute to all who contributed in any way to the erection of the headquarters building Over thirteen thousand people pledged funds for this great undertaking I especially desire to express thanks to the members of the various committees engaged in this work For ten years they labored for the attainment of their goal They have made a contribution to the ASSOCIATION and to pharmacy which will stand as an inspiration for ages to come The joy which comes from doing the job should be theirs on this great occasion

The past year has been an outstanding one in the A PH A For a long time, the ASSOCIATION has been working for the recognition of pharmacy as a requirement in every hospital It is with pleasure that I announce that the Council on Medical Education and Hospitals of the American Medical *Association* has accepted this view, and now lists pharmacy among the essentials of a registered hospital The Council states that "the handling of drugs should be adequately

supervised, and should comply with State laws" The AMERICAN PHARMACEUTICAL ASSOCIATION is to be congratulated in bringing this great effort to a highly satisfactory conclusion

The final publication of the Prescription Ingredients Survey and the Studies of Professional Pharmacy as carried out by the St Louis Drug Store Survey impress me as basic contributions to the betterment of pharmacy They supply the structural data upon which the profession depends I strongly urge these publications upon the educational and registrational groups, and upon all interested in the development of pharmacy along professional lines

The fiftieth anniversary of the establishment of the National Formulary is fast approaching The ASSOCIATION should mark the occasion in a fitting manner It is noteworthy that the New York Branch has already commemorated the forerunners of this highly significant event The National Formulary is one of the great pieces of work the ASSOCIATION has developed It is recognized, together with the United States Pharmacopœia, by federal and state food and drug laws as a legal standard In many states, the pharmacy laws demand that a copy of the current standards be kept in all drug stores at all times It is recommended that a determined effort be made to have such a provision in the laws of every state The National Formulary has become an essential adjunct to medical practice It is a most fitting expression of professional pharmacy The ASSOCIATION should never lose sight of its responsibility in this matter, and should bend its every effort to maintaining the National Formulary in the high position it has attained The ASSOCIATION is greatly indebted to Doctor E N Gathercoal and his colleagues on the Revision Committee for their devoted work preparatory to issuing the sixth edition

The annual observance of Pharmacy Week had its inspiration in this ASSOCIATION, and has always been regarded as peculiarly within the field covered by this body I have always felt that setting aside one week for the presentation of professional pharmacy to the people of this and other lands is as little as a professional group can do I have not the slightest doubt that the future of pharmacy depends entirely upon its professional service It is the basic thing in every pharmaceutical effort Pharmaceutical legislation, pharmaceutical education, the whole of pharmaceutical service rests upon the professional character of pharmacy Pharmacists should be keen to recognize this, and diligent in their efforts to impress it upon the public mind I cannot be too emphatic in urging pharmacists to embrace every opportunity to advance and elevate their professional work as a basic and fundamental thing The principles underlying it are sound, and the whole idea is a dignified and worth-while approach to a most important subject I hope that 1934 will witness the most zealous observance of Pharmacy Week

The Remington Medalist this year is Sir Henry S Wellcome This medal is awarded by the New York Branch of the ASSOCIATION to that pharmacist who has done most for pharmacy Sir Henry would seem peculiarly worthy of this honor He is one of the truly great men developed in this profession His research studies have benefited the entire world He is regarded as one of the most enlightened philanthropists It is fitting, I think, that the award should be made an outstanding feature of this meeting

There are some defects, so I believe, in the organizational set up of the ASSOCIA-

TION It is my judgment that the retiring president should become a member of the Council Such a procedure would benefit the ASSOCIATION by keeping the president in active service for at least two years I, therefore, recommend that the Constitution and By-Laws be amended so as to bring this condition about. I have no hesitancy in making this recommendation because, under the rules, it could not become effective until the close of my successor's term of office

I am also constrained to suggest that study be given to the custom which has sprung up of nominating the chairman of the House of Delegates for the presidency In this matter I speak from experience Inasmuch as the chairman of the House appoints the Committee on Nominations, I have felt that it was an embarrassment to him to be the recipient of honors at the hands of his own committee If the chairman, by virtue of his office, is to be nominated for the presidency, then the By-Laws of the ASSOCIATION should so state A study of the matter over the past few years will show an almost unbroken precedent in this respect I have no real objection to the matter although the House of Delegates was not organized with this thought in mind However, simply to bring the question squarely before the ASSOCIATION, I recommend that the chairman of the House of Delegates be ineligible for nomination for the presidency during his term of office In case this is favorably acted upon, I further recommend that it shall not apply, in any sense, to the incumbent chairman or vice-chairman

I have come to the conclusion that it is probably unwise to nominate three candidates for the presidency Such a three-cornered contest seems to me unsuited to the purposes of the ASSOCIATION I should prefer to see two candidates only As the matter now stands, the Committee on Nominations can be regarded more nearly as a Committee on Elections By a strategic grouping of the candidates, the election of one can be readily brought about I think it would be much more in harmony with fair practice to make nominations on the basis of merit, and leave the election to the wishes of the membership A Committee on Nominations is a helpful thing only so long as it restricts itself to making nominations It goes beyond its province, and renders the ASSOCIATION a pronounced disservice when it seeks to control the election I think the successive Committees on Nominations should be instructed to study the general prevailing conditions, and to select men from different sections of the country for nomination for the presidency, so that all sections might be honored in this way Of course, the governing principle should always be the good of pharmacy and the advancement of the interests of the ASSOCIATION However, it is believed that this principle can be served and all sections of the country recognized at the same time For this reason, I recommend that the By-Laws be so amended as to provide for the nomination of two candidates only

I have given careful thought to the work done by the Committees on Prescription Tolerances and Weights and Measures As the work of these two groups develops, it will be found mutually inclusive I thus suggest that the chairman of the one shall be an ex-officio member of the other I recommend that the chairman of the Section on Practical Pharmacy and Dispensing be an ex-officio member of each of these committees This section is peculiarly concerned with prescription tolerances, and the actual conditions under which compounding and dispensing are carried on, and should have an official part in furthering these two Asso

CIATION projects The annual reports of these committees should be submitted to the Section on Practical Pharmacy and Dispensing as a regular routine

Some notice should be given the great questions raised by the passage of the National Industrial Recovery Act Pharmacy, in all its branches, became immediately involved in the machinery thus set up Some have criticized the ASSOCIATION, because of its strong place in the professional field, for taking a part in what the critics have wrongfully considered a purely economic problem However, the NRA movement is not necessarily economic I would prefer to state its purpose in terms of social adjustment In other words, pharmacy, together with all other interests, was drawn into an effort, the ultimate purpose of which is to effect profound social change With this view clearly in mind, I doubt that anyone can deny that this ASSOCIATION had a real place in working out whatever was thought best for pharmaceutical interests For my part, I think the ASSOCIATION would have been grossly derelict in its duty had it failed to take its share of the responsibility Whatever may be the ultimate results of the recovery program, every one knows that it has brought about profoundly significant changes in our national thinking and point of view The present manifestations on the political screen may be understood and accepted with less difficulty if they are seen as an effort to work out a sounder social creed, and to make social forces more compact and articulate Undoubtedly, it is a profound experiment in the realms of sociology and economics But, the mere fact that it deals in vastly important human equations, and is devoted to the betterment of human relations, makes it an experiment in which all must participate

The NRA program, the whole code effort, as imperfect and contradictory as it undoubtedly is, is simply the first manifestation of forces seriously devoted to the task of creating a new economic system which will be more responsive to the social impulse Much of what is being done is highly controversial Some see in it an attempt to overthrow existing political institutions Some have gone so far as to declare that we are in the midst of a social revolution, the aims of which are in open hostility to constitutional government as that term is generally understood I think there is real evidence of some such desire on the part of those who are easily influenced by philosophies they cannot understand, and who fall a prey to silly and half-baked generalities Specifically, I am content to leave these mental scarecrows, whether they be in the Government service or outside of it, to sizzle in their own pot They are no more than mildly pathologic pimples on an unusually healthy body Whether they disappear or whether they remain is not of the slightest importance America, thank God, rests on something more secure

I am certain that in due course, and time must be given to working out any fundamental concept, the general principles recognized in the codes will be shown to be advantageous to all branches of industry and society Already it must be apparent that the imperfections and contradictions are being ironed out In all of the present disturbances and confusion, we should seek to see things over a long range The mere fact that an attempt is being made to meet certain situations is a far cry from an abandonment of our basic institutions I am certain that we shall emerge from the present strife a more intelligent and a more awakened people

I am truly proud of the great part played by the ASSOCIATION in this national drama I am proud that its prestige was recognized, and that its sane and con-

servative view was relied upon in working out the problems of the past few months Undoubtedly, the ASSOCIATION has won a larger place in the hearts and affections of pharmacists themselves I know that the Government has come to a much sounder appreciation of what pharmacy is from the mere fact that the ASSOCIATION faced into the fight rather than standing on the side-lines while issues of such ter rific importance were being fought out

At this point, I should like to suggest that some study be given to the forma tion of state codes I am inclined to feel that much of the Federal systems of codes will prove unsound and unworkable There is grave doubt regarding their legality Aside from the national emergency, they would undoubtedly be given little consideration They are in direct and flagrant conflict with constitutional government in this country To make them permanently effective requires a complete abandonment of the principles for which the country is understood to stand After the emergency has passed, there will still be good reasons for out lawing unfair business practices, and for retaining public supervision over hours and wages of employment While there is no assurance that state codes will be free from legal defects or constitutionally sound, it is believed they offer some promise of permanently dealing with certain aspects of the matter State codes have been set up in a few states It is recommended that a special committee be appointed to make a thorough study of all state codes, and the legislative acts under which they have been created, as many of their provisions are certain to affect the conditions under which pharmaceutical service is made available

I cannot forego this opportunity of expressing officially and personally my profound appreciation of the part played by Doctor E F Kelly in the great scenes of the past few months Pharmacists everywhere should know just what a bur den he has carried With no intention of disparaging in the least the work done by other pharmacists and other pharmaceutical organizations, I am confident that Doctor Kelly has carried a large part of the load Against his will, he was drawn into the center of the fray from the very outset He was called upon to work out the problems which became acute under the President's reemployment agreement When the whole matter became deadlocked over the hours under which drug stores were to operate, and pharmacy stood to suffer extremely heavy burdens, other pharmacists and other organizations called upon Doctor Kelly to iron things out In all of this, he consistently refused to appear except as cooperating with others for the general good He bore the brunt of the negotiations which finally resulted in the Retail Drug Code Upon the insistence of national pharmaceuti cal leaders, he became a member of the National Retail Drug Trade Authority Later, by the same forces, he was placed on the Committee on Service and Distri bution, to make a study of distribution factors which affected the retail field He has been in almost continuous contact with NRA officials, and has done much in bringing them to a sounder and more equitable view of many problems bearing upon the professional and commercial phases of the drug store Pharmacy owes him a debt far beyond its power to repay

I should like to devote a few serious remarks to the so-called "labor contro versy" that has sprung up in pharmacy as a result of Paragraph 7-*a* in the National Industrial Recovery Act This paragraph provides for collective bargaining be tween employer and employee I have publicly stated that I was opposed to col

lective bargaining in pharmacy I am certain that my position has not been fully understood I am certain, too, that it has been deliberately misunderstood and misinterpreted by some Some have attempted to make it appear that I was hostile to the interests of those employed in retail drug stores While such criticism is utterly unfounded and directly opposite to my feeling in the matter, I shall make an effort to clearly present my views on this very important question

By stating that I was opposed to collective bargaining in pharmacy, I merely meant to express the feeling that pharmacy could and should manage its own affairs I meant to voice my opposition to bringing labor tactics into a professional field In no sense did I mean, even by implication, to create the impression that I was opposed to a betterment of the conditions under which some employee-pharmacists work Employee-pharmacists are members of the pharmaceutical profession, and should be entitled to all the benefits and privileges which come to members of a professional class It is my honest and serious conviction that, in the long run, bringing labor methods into pharmacy will result disastrously to all pharmaceutical interests

By this statement, I do not mean to enter upon a discussion of the merits of any labor movement when confined to a purely labor field I do not claim to be sufficiently informed regarding general industrial conditions to voice the slightest criticism of the methods labor feels are necessary to its security and welfare I am merely attempting to emphasize the dangerous consequences which are likely to follow when a professional calling is made to conform to policies and procedure which have been worked out in industrial and labor pursuits I am convinced that there are basic and insurmountable objections to making pharmacy subject to the forces that control in a purely labor enterprize

First of all, and this is of basic importance, no great distinction exists between pharmacist-employer and pharmacist-employee In fact, the distinction which may be said to exist is purely artificial In most cases, it goes no further than to impose greater business responsibility upon the employer The employer must of necessity assume the burdens which go with ownership, and he must exercise sufficient authority to make his plans and policies operate This is unavoidable if the store is to function in a satisfactory manner However, I am certain that this does not constitute a disparaging distinction Disparaging distinctions, if they do exist, should be brushed aside as inconsistent with the close relationship which must exist between the pharmacist-employer and the pharmacist-employee

Pharmacist-employer and pharmacist-employee hold a unique relationship to each other They come in close personal contact, and are engaged in exactly the same duties The law requires that both shall conform to the same educational and professional standards Both must measure up to the same degree of competency and skill Each is a graduate of a recognized educational institution, and frequently it is the same institution The law prescribes their duties, and confers the same privileges Their daily work touches vitally the life and happiness of people They are mutually dependent upon each other The reputation of the employer is in the hands of his employee, and the reputation of the employee is in the hands of the employer Mutual obligations and mutual responsibilities rest upon both There would seem no possible justification for industrializing this

peculiarly intimate relationship It would seem the one place where mutual confidence and respect should have full sway Anything which disrupts or attempts to destroy this relationship comes very close to being inconsistent with the public welfare

However, for fear this statement may be construed as submitting the ideal instead of what actually exists, let it be admitted frankly that there are many cases in which pharmacist-employees have not received the proper treatment or been accorded proper recognition with all that the terms convey Studies by the NRA and others have shown inadequate pay, long hours and other unwarranted conditions Employees are well within their rights when they insist that such conditions shall be remedied whenever and wherever they exist Pharmacy, as a whole, should encourage the expression of honest opinions, and should make no attempt to escape a facing of the facts If unfair conditions exist, no progress worthy of the name can be possible until the facts are recognized and dealt with as they deserve

I believe that remedial measures can be applied within our own ranks Nothing is required beyond an awakened professional consciousness Organized pharmacy, as that term has been understood, should make every effort to learn the facts and to deal with them It should be regarded as a family affair to be dealt with as family discipline demands An immediate survey should be made of every drug store in the United States to ascertain the hours of employment and the prevailing pay for pharmacist-employees While state and local pharmaceutical organizations might well carry out the survey, I suggest that the United States Government be requested to do it so that there can be no question as to its accuracy and fairness This whole question goes to the very heart of professional integrity, and I believe the AMERICAN PHARMACEUTICAL ASSOCIATION should take the leading part in working it out

Employee organizations, on the mere basis of recognizing the employee status, are, in my opinion, unfortunate They serve to fan prejudices and perpetuate distinctions which should not exist at all They also serve to accentuate differences and problems which may not be nearly so acute once the facts are known It would seem much better to organize, if the employees really feel that separate organizations are needed, so that their professional status always stands out My own feeling is that the existing pharmaceutical associations afford every necessary means of meeting their problems, and I urge that these bodies make every effort to cooperate as fully as possible with the employee-pharmacist in solving their mutual problems However, in spite of what form the employee movement finally takes, there is a great responsibility resting upon both the employer and the employee Neither should countenance any act by the other which is damaging to the inherent thing so necessary to both Both sides should regard themselves as saddled with mutual responsibilities and as faced with mutual obligations The welfare of the profession is the basic thing, and this is larger than any issue which either side can raise

In any consideration of this subject, it should be borne in mind that retail pharmacists have felt their full share of the economic distress All over the country, city and town alike, operating costs have steadily mounted while sales volume has dropped to unprecedented levels Profits have disappeared, and hundreds,

if indeed not thousands, of retail drug stores have been operated at an actual loss Undoubtedly, some employers, in pharmacy and outside of it, have taken advantage of the unfortunate period through which we are passing However, I shall be much surprised to learn that the great majority of pharmacist-employers have not done their very best under most difficult and discouraging conditions The facts, once they are ascertained, can be understood only in the light of circumstances

Some reference should be made to pending food and drug legislation At the 1933 meeting, the ASSOCIATION took the position of favoring all changes necessary to the protection of the public and as in opposition to delegating sweeping and unregulated powers in its administration I have adhered to this position strictly Personally, I was opposed to many of the provisions contained in the original Copeland bill The very extensive and general powers conferred upon the Secretary of Agriculture impressed me as unnecessary to the proper protection of the public, and as inconsistent with many established principles of constitutional government Some went so far, so I firmly believe, as to set aside basic concepts of the common law which have been cherished as essential to a liberty-loving people I have always felt that it was unwise, and in most cases unnecessary, to place great undefined powers in the hands of administrative officials It is a tendency in government which I think is definitely dangerous, and which I shall always oppose If this country is to move forward in the realization of the great purposes to which it is dedicated, it must continue to be a government of laws and not of men

From the very beginning, it has been my opinion that the present Food and Drugs Act should be amended, and nothing which has transpired has shaken this view It has been said, of course, that the act was so hopelessly defective that it could not be amended so as to meet current needs This, to me, is mere propaganda, and has no support from the actual facts Following through the policy adopted by the Government is certain to throw out of gear State and Federal cooperation, and to produce a confused mass of contradictions which will plague us for years to come It seems to me the most impractical means of meeting the situation However, the Government seems committed to the impractical means, and I set forth this view simply to make my position clear

I am confident that sounder legislation will result from the criticism which the various Copeland bills have received There is no longer any intention of conferring arbitrary and unnecessary powers upon administrative officials The whole job is being looked upon in a saner and altogether sounder way, and thus is certain to result in a much safer, and a much more effective piece of legislation As a personal view, I desire to concur fully in Senator Copeland's statement that he would rather have no legislation on the subject than to accept a meaningless and spineless compromise I believe there are great defects in the present act, and thus great public reasons for bringing it up-to date I agree with the desirability of every objective which these bills have sought I regret that an arbitrary position by the Government, calling forth an equally unyielding attitude from the industries involved, has made the outcome very much confused

In all of this, the ASSOCIATION should hold fast to certain principles The Food and Drugs Act should be rewritten so as to include cosmetics, and to bring

advertising under federal supervision and control No necessary power should be denied the enforcing agency The public interest should be the paramount consideration On the other hand, broad, sweeping and uncontrolled powers should be withheld as unnecessary to the purposes of the act, and as inconsistent with our theories of government Industry should not be unduly harassed, but should be given every freedom consistent with the basic purposes of the act

It is my belief that the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Drug Trade Conference rendered a real service to the country in opposing certain features of the Copeland bill Their position, presented in a forceful and logical manner, centered attention on the bill's dangerous provisions, and was the most potent influence in having them substantially modified

This ASSOCIATION asserted the need for higher drug standards back in 1852, and since that time has stood steadfastly behind all efforts to bring this about by legislation Many times its voice was the only one raised to this end It stands to-day, I have no doubt, ready to cooperate in all efforts to protect the public by demanding the highest practical standards for foods and drugs Its position throughout the present controversy has been in keeping with its high professional standing, and consistent with a sound regard for constitutional government. And this, let me insist, is vastly more important than extreme views whether they be advanced by overly zealous governmental experts or by selfish reactionaries in the food or drug industries

It will be recalled that some few years ago the ASSOCIATION, in cooperation with the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy, sought to have a comprehensive survey made of pharmacy to ascertain the basic facts underlying it This survey was not actually begun because of the lack of funds It is to be hoped that this undertaking can be carried out as promptly as possible The time has come, I fully believe, when pharmacy must be seen in terms of social force if it is to keep step with the thought and tempo of the times

We might as well realize that no permanent progress can be made unless we understand the meaning of pharmacy in the life of the day It is to be remembered always that a new standard has been set up The time has come when every effort will be judged and every activity measured in terms of its value to people The present cry for the socialization of government, the socialization of medicine, and the socialization of industrial and economic forces is no more than an effort to reflect everything against the screen of human relations Pharmacy cannot escape It, too, must be measured in terms of its social significance

I make these observations as supporting my belief that pharmacy has suffered because no effort has been made to fully understand and evaluate it Failure to understand it has resulted in a failure to adopt and follow through a sound and workable policy of thought and action At no time has pharmacy coolly and deliberately set itself to the task of working out its problems, and directing its aim to some definite objective Questions have been considered largely in their own setting, and with no regard to their bearing upon larger and more basic things It seems to me that pharmacy has been content to live for the moment There has been too much of a disposition to accept things as they apparently were rather than dealing with them in terms of actuality Many times pharmacy has been

swept into positions utterly inconsistent with its real purpose Such a policy, or rather the lack of one, has brought our calling close to professional extinction and on the verge of economic ruin We too often have fallen a prey to our nightmares, and have been controlled by conditions created by our own folly

As a result, every possible incongruity has grown up As pharmaceutical education has advanced, there seems to have been a corresponding slump in professional morale Pharmaceutical legislation has not controlled unethical practices, and the economic side of the drug store is in a deplorable condition No relationship exists between the needs of the public and the number of drug stores Drugs and medicines are sold in every type of retail outlet Everywhere and on every hand is shown the results of a failure to meet our problems in a fearless and intelligent manner

I, therefore, urge that every effort be made to complete a social study of pharmacy I feel that real progress cannot be made until the facts are fully known Such a study would furnish the basis for a more definite and practical educational program It would answer all the questions underlying legislation It would put at rest all questions arising from a lack of understanding of the real factual situation It should be regarded as one of the major objectives of pharmacy, and should be undertaken and completed as promptly as possible

The time has come for the ASSOCIATION to take the lead in an organized effort to more sensibly restrict the distribution of drugs and medicines to registered pharmacists The conditions which now prevail are a reproach to our profession It should be plain to all that the public will be better served and more safely served by placing the responsibility squarely in the hands of those whose training and experience fit them for this professional function There is no justification, commercial or otherwise, for permitting such dangerous products to be indiscriminately and promiscuously sold

However, the field is a difficult one, and must be approached after a careful survey of all of the factors involved First of all, the court decisions, holding restrictive sales unconstitutional, should be carefully analyzed It must be apparent that no legislation will stand court action that does not meet the objections raised by these judicial decisions There are long-established principles of law which must be recognized in this matter, and the legislation must be drawn so as to conform to them I mention this phase of the subject because, at the outset at any rate, the whole thing must be approached from a legal point of view

This is no place for experimenting or for following out individual views Most of the efforts which have been made to restrict sales have been ill advised, and the legislation proposed, in by far the larger number of cases, open to serious legal criticism

The point to be borne in mind is that all efforts which are not legally and economically sound do much more harm than good About the only contribution they make is to irritate and solidify the opposition Already there is an effort being made, on a nation-wide scale, to organize all other dealers so that the present situation may be continued There are large commercial interests traditionally opposed to permitting pharmacists the exclusive distribution of drug products These interests are powerful and resourceful Nothing but the most carefully thought-out plans have the slightest promise of success The whole thing calls

for the services of informed and careful men There is no place for the novice and enthusiast

From the very outset, the ASSOCIATION has contended that drugs and medicines should be made available only through competent pharmacists It has consistently opposed the doctrines that they were mere articles of merchandise, to be bartered and sold, subject only to the rules of the market place In 1853, the ASSOCIATION made this historic pronouncement "The first step to improvement is that storekeepers in boroughs and towns shall relinquish the sale of drugs, medicine is merchandise, and something more, to sell it in a common country store is to make it merchandise only" Drugs and medicine have no purpose other than meeting the demands of public health They are merchandise in only a most incidental manner They should be distributed only by pharmacists whose training, experience and sense of responsibility fit them for this important duty

Too much time has already been lost, and the time for aggressive action has come I recommend that the AMERICAN PHARMACEUTICAL ASSOCIATION reaffirm its time-honored position that drugs and medicines should be distributed by registered pharmacists only, and that a carefully selected committee be appointed to draft a model act to bring this condition about in every state

There is a growing feeling that the whole body of pharmaceutical legislation is in need of a thorough revision There is no doubt that much of it is obsolete and expressive of conditions and theories of fifty or more years ago In structure, scope and basic principles, it is hopelessly out of step with the times It still reflects the period when the handling of drugs and medicines was a purely merchandising and commercial transaction These laws do not, as a rule, recognize broadly the great advances made in pharmaceutical education They are based upon commercial practice rather than upon the public health service which pharmacy renders The exceptions and exemptions in the pharmacy laws are so broad as to amount to a virtual nullification of many of the most important principles in these acts To make matters worse, the exceptions have no logical foundation, and are based on nothing other than a selfish purpose on the part of certain powerful groups in the drug industry who have always insisted that their products be given unregulated distribution There is no need to attempt an analysis of these acts at this moment However, I do desire to express my feeling that the basic philosophy of pharmaceutical legislation should be responsive to current conditions I strongly urge that it be made more aggressive and more in keeping with the spirit and tempo of the times It should be based entirely upon the public health importance of drugs and medicines, and not at all upon purely business or commercial considerations I recommend that the ASSOCIATION give serious study to this matter, and that some agency be set up to study pharmaceutical legislation so that it may be modernized and made consistent with the advances being made educationally and professionally

I want to express my deep interest in the efforts now being made to bring the public health profession closer together Nothing but good can come from such a course In some sections, this has not gone beyond medicine and pharmacy In others, notably in Kansas and the Pacific Northwest, medicine, dentistry and pharmacy have consolidated their influences, and have become committed to the advancement of public health as an organized and official policy The advantages

from such a course are many The program of one will have the endorsement and support of all The various professions will come into more intimate relationship, and a sounder and more mutual understanding is certain to result I urge the pharmacists of every state to participate and cooperate in all such efforts

The movements to make medicine more familiar with the United States Pharmacopœia and the National Formulary are entitled to whole-hearted pharmaceutical support The more medicine relies upon official preparations, the more pharmacy will advance as a professional pursuit This effort should include the students in the medical schools While the medical curriculum has paid little attention to the practical sides of medication, and has sent the graduate out to practice poorly trained in this important subject, there is evidence that the pendulum has begun to swing in the other direction One great medical school has recently placed its department of pharmacology in the hands of a pharmaceutical expert It is to be hoped that this is the beginning of a national trend The more physicians know about drugs and medicines, the more they know of the U S P and N F, the greater their value to the public Pharmacy should cooperate to the fullest possible extent in placing the official standards before the medical profession No doubt, it would be wise to prepare digests of the official products, with due regard to prevailing medical theories, and make them available for wide distribution to medical men This is a work peculiarly within the scope of this ASSOCIATION'S activities, and should be done as promptly as possible With the active cooperation of the Committees on Revision of the United States Pharmacopœia and National Formulary, this should not be an unduly difficult or laborious task

The question of ASSOCIATION membership has become of critical importance During the past year, I devoted much time and considerable expense to efforts for building up membership Literally hundreds of letters were written to persons whose names were furnished by interested persons in the various states The results, as evidenced by new applications, were most disappointing Of course, there are many reasons why this year should not be regarded as an average year In many sections of the country, the depression was most acute Nation-wide drives by other organizations also diminished the effect of my personal appeal However, I am constrained to feel that, even in normal years, the membership cannot be built up by anything less than an organized and systematized effort It almost emerges into a separate ASSOCIATION activity, which goes beyond mere routine It requires the earnest cooperation of the membership as well as the active support of all groups concerned with professional pharmacy If the ASSOCIATION is to adequately represent pharmacy and to speak for it in authoritative tones, it must be given greater numerical support It must be so strengthened that none can assail its position or question its views Professional pharmacy demands the services of a strong national association, and such an association should be given strong and consistent support

I think the ASSOCIATION has not, in times past, seen the advantages of making membership in the ASSOCIATION a badge of distinction Membership in the ASSOCIATION should be synonymous with professional standing It should bring prestige It should be something to which pharmacists would aspire In order that this conception may be realized, I am convinced that membership in the ASSOCIATION should be made more selective It should be based upon merit as a

major consideration If pharmacy is to persist as a professional calling, and pharmacists be accorded recognition as an educated group, it must, in the ultimate, depend upon that relatively small number of earnest souls who refuse to be blinded by the flare and glare of the passing scene In spite of its apparent conflict with prevailing doctrines of social policy, the world will be led back to safety and security, not by the rank and file, but by a few men whose souls have refused to be tarnished by the dust kicked up by the popular hue and cry

In line with this thought, a determined effort was made to bring the ASSOCIATION directly to the attention of all the graduates of the colleges of pharmacy in this country in the past few weeks Through the fine cooperation and courtesy of the deans, lists of the prospective graduates were furnished To each of these was sent a note of congratulation, and a dignified invitation to become members of the ASSOCIATION These invitations were signed by the president, secretary and chairman of the Council I do not know how successful the effort may be, judged only by the number of applications, but I am convinced it should be made a regular ASSOCIATION activity, and I so recommend The response of the colleges was most inspiring Nearly every dean expressed the feeling that the effort was most timely

As a wider plan for membership on constructive and basically sound lines, I suggest, first of all, that the colleges of pharmacy be asked to award a certain number of memberships a year This number should not exceed eight in the larger schools, and proportionally in the smaller ones These memberships should be awarded on the basis of scholarship considered in connection with whatever factors the schools should see fit to include In making this suggestion, let it be understood that I am fully aware that pharmaceutical education has given loyal support to the ASSOCIATION I am merely asking their continued support so that each year the best of their graduates may come into the ASSOCIATION It is my thought that the wider the influence of the ASSOCIATION, the greater the prestige of the schools, and the more worth while the profession As a matter of information, it should be stated that a number of colleges have been awarding such memberships for a number of years In these institutions, the memberships are given in reward for scholastic standing, and have proved an incentive for higher scholarship

I also strongly suggest that each pharmaceutical association be urged to cooperate in a similar manner The larger associations might well be asked to grant ten memberships, and the smaller ones accordingly These state memberships in the A PH A should also be based upon some meritorious qualifications Simply as indicating the basis of the awards, I suggest that those obtaining the highest marks in the State Board of Pharmacy examinations be recommended for membership

The State Boards of Pharmacy might work out a similar plan as well I can see some advantages from awarding membership in the A PH A to the one making the highest mark in the examinations It would be a recognition of merit, and might stimulate increased interest in the prospective registrant It may be said, of course, that the funds of the boards are public, and thus not available for such purposes I believe it can be shown that contributing to those agencies engaged in the betterment of professional practice is well within the letter and spirit of the pharmacy acts

I also urge that the attention of the pharmaceutical press be directed to the importance of building up the membership in the A PH A along constructive lines I believe each pharmaceutical publication might find it desirable to award membership in the ASSOCIATION to those contributors presenting the best articles during the year Simply as a recognition of merit, such a plan might well raise the standard of much that appears constantly in the press

In addition to these suggestions, I think it high time the ASSOCIATION took notice, officially, of the vast amount of material appearing in the pharmaceutical press Week after week, month after month, year after year, the press grinds out millions of pages of pharmaceutical interest These publications present the stuff from which pharmaceutical opinion is crystallized, and out of which is constructed the current pharmaceutical policies

We have been woefully wasteful and neglectful in this particular No effort has been made to influence pharmaceutical journalism, or to move it in the right direction It represents a vast power for good, and yet, so far as we have been concerned, it has been no more than a moving current which soon becomes no more than water over the dam The force, power and significance of the pharmaceutical press should be recognized by the ASSOCIATION, and some basic attempt made to have it serve, broadly and constructively, the great objective toward which we aspire

In order that the press may be stimulated to finer service and higher ideals, I recommend that the ASSOCIATION award a medal, yearly, to that publication meeting a certain standard of excellence There is no reason why this medal should not become to the pharmaceutical press what the Pulitzer prize is to the great daily press It should be awarded for merit, and for the general excellence of its presentation The award should be made a pharmaceutical occasion, comparable in importance and dignity to the Remington Medal award

Now, just how, and by what means can these membership plans and suggestions be worked out? I have given careful thought to this matter I have canvassed the whole pharmaceutical field, and, after every effort, have come back to this conclusion There is no group in American Pharmacy more able and better qualified to work out these plans than the former presidents of this ASSOCIATION These men represent maturity in judgment, and a wide and varied experience They embrace, in an unusual degree, the essentials of leadership They measure up to a high educational and professional standard They have been in close touch with the ASSOCIATION'S affairs, and know its needs and objectives Geographically, all sections of the country will be recognized, and virtually all branches of pharmacy It is my recommendation that the former presidents of the ASSOCIATION be formed into a permanent body to be styled, the A PH A Commission on Membership and Awards This commission should organize by the election of its own officers, and should be given a permanent place in the American Institute of Pharmacy, and given adequate financial support as soon as this can be done

In making this recommendation, I am mindful of the fact that the past-presidents may feel that they have earned the right to retire In answer, let me state that they have been greatly honored by this ASSOCIATION and that this alone is sufficient to place additional burdens upon them But my recommendation is based upon an honest conviction that they are the best qualified for this highly

important task Upon its success may be said to rest the future of the ASSOCIATION I urge them to join hands in this new endeavor

In conclusion, let me pay my deep personal tribute to Doctor Kelly and Editor Eberle for their untiring efforts in behalf of this ASSOCIATION Only those permitted to work intimately with them can know their fine loyalty, their inspiring devotion, and the high ideals they bring to their tasks Pharmacy, in its widest phases, has cause for congratulations because of the earnest work these men are carrying on May they live long, and enjoy the blessings of good health and happiness!

To the ASSOCIATION and its membership, collectively and individually, I express my sincere thanks for the confidence and trust reposed in me To head this great ASSOCIATION, even for a brief period, is to enjoy the greatest distinction within the power of pharmacy to bestow To have been thus honored at your hands will ever remain my most cherished memory

---

ADDRESS OF THE CHAIRMAN OF THE HOUSE OF DELEGATES

BY P H COSTELLO

To the Members of the House of Delegates of the American Pharmaceutical Association

A welcome opportunity, it is for us who are interested in the welfare and progress of American pharmacy, to figuratively join hands once again at this annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION here in Washington

Members of a great profession devoted to the service of humanity, we, who are gathered here, hold a keen interest in national developments not only as they affect us as patriotic and loyal American citizens but, and naturally so, as they touch upon the course of our own profession Representing individual pharmacists in this changing order our ASSOCIATION must do its part Let us hope, therefore, that this meeting in our Capital City will bring about a better appreciation and understanding of the value of Pharmacy and the great purpose it serves

We can now point with a great deal of pride to our headquarters building, *The American Institute of Pharmacy*, located in this city It is a monumental achievement It is entirely fitting and appropriate that an organization, such as ours, should have as its headquarters a building such as this, and it is also proper that it should be located in the Capital The past several months should show the wisdom of the new location of our headquarters because events, which affect all of us, have been happening daily here in Washington with lightning like rapidity Any other location would have proven a mistake and a handicap to our future welfare and progress

It is a privilege, possibly it may become a distinction, for those who have availed themselves of this opportunity, to be present at the dedication of our building during this convention The founders of the AMERICAN PHARMACEUTICAL ASSOCIATION intended the organization should carry on Possibly they visualized some of the progress and achievements that were to come, but it is hard to assume

any one of them ever dreamed of an organization such as we now have with a headquarters building of our own in this city It should be an inspiration to us, but probably more, and let us sincerely hope so, that it may prove to be the beginning of a new era for Pharmacy This will depend upon ourselves

It has been said, and the statement remains unchallenged, that the AMERICAN PHARMACEUTICAL ASSOCIATION has promoted the highest principles of professional pharmacy for more than eighty years In this regard, it is our good fortune the organization has succeeded in a fair measure to accomplish what it set out to do To rest on our oars now, satisfied with the accomplishment thus far, would gain us nothing Nor can we long continue to maintain the prestige of our profession unless we are guided by past experience and make it possible for ourselves to render a greater service in the future

At present we find many conflicts of thought, ideas and endeavors among pharmacists, evidenced most notably by their public expressions What is more significant is the extreme differences of their opinions and viewpoints Ours is a very complex profession when one considers all phases of pharmacy and pharmaceutical activity Whether we are to strive for the higher professional attainments alone, or whether we shall seek to bring all the conflicting groups together for a more united and stronger pharmacy under one association, the future will decide Any program that is not all-inclusive, or neglects the welfare of some, will fail

P H COSTELLO

During the last few years we have been led to believe that a large majority of the more than fifty thousand drug stores in the nation have suffered from one cause or another It is not strange at this time that a majority of retailers are mostly concerned with their economic welfare, fair trade practices and profit Codes and commercial problems are their first concern and their plight cannot be ignored by any organized group of pharmacists Upon their success to emerge from their dilemma depends not only their own welfare, but also that of many more employed pharmacists The failure to stabilize retail pharmacy will result in its downfall

Even between the separate national organizations, there must be cooperation There can be no distinction or classification in Pharmacy One may be able to render a higher type and a more skilled professional service in an exclusive prescription laboratory than is possible in some remote area in an ordinary drug store Just as those employed in the first instance are especially qualified and equipped, the owner of a pharmacy in the remote region may not be Yet each renders a pharmaceutical service, and the service rendered by the latter may be quite as valuable to those depending upon him as in the former case We may adopt minimum standards for equipment, as we have adopted minimum qualifications for pharmacists and minimum standards for drugs, but such a forward step should not deny any community the type of pharmacy it can support and maintain

I desire to quote from a tribute paid to pharmacists by the Governor of my state in his last Pharmacy week proclamation

' This is a profession which quietly, and without what we know in our modern vernacular as 'ballyhoo,' has devoted itself to the preservation of the nation's health, the profession which numbers among its followers some of the real heroes of contemporary history

When I say heroes' I mean the druggist in the little Arkansas town who was called upon by his fellow citizens to join them in taking to the hills, while the flooding waters of the Mississippi swirled on the floor of his store This druggist's answer was to move his medicines to the higher shelves and lay a new floor composed of boards laid from counter to counter The people needed medicines and he stood by, preserving them from the greedy river

I mean the pharmacists, numberless, who during the great 'flu' scourge, abandoned sleep to stand unseen in the back of their stores to fill the unprecedented rush of prescriptions There is no doubt but that a great number of them sacrificed not only health, but life, in so doing

I mean also, and perhaps with even warmer gratitude, because I have been closest to him, the small town druggist who has helped so materially to build up North Dakota, the kindly citizen who stands ready to do any thing, from dispensing cough syrup to giving ether while the country doctor performs an emergency operation

Millionaire philanthropists are lauded in headlines every time they part with one of their many millions to endow a college or camp Some day, I hope to see in the biggest, blackest type there exists a list of those pharmacists whose fortunes were slowly, unspectacularly, dissipated in the form of little bottles of cough syrup and croup vaporizers to save the lives of babies whose parents were too poorly paid, and often too harassed to even give thanks "

Among the delegates to this body, and members in attendance at this con vention, are most of the leaders of Pharmacy I am confident they have given, and will continue to give, their best in a fearless and sincere effort to carry out a sensible policy and program that will enable Pharmacy to progress And may each one of us take home with us from this convention something of value to our state and local associations

In closing, I want you to know I am not unmindful of, nor ungrateful for the honor and privilege you have bestowed in permitting me to serve as Chairman of the House of Delegates this past year I deeply appreciate it Thank you

---

ABSTRACT OF PAPER, SCIENTIFIC SECTION, A PH A

Further Studies on Psyllium (illustrated with lantern)," by H W Youngken

Plants with mature fruiting spikes and seeds were obtained by the author from growers of commercial Psyllium seed in Spain and France identified by comparison with authentic herbarium sheets and authoritative descriptions in the literature The seeds were separated from these and compared with commercial lots of Psyllium on the American market, thus permitting certain identification

The seeds of *Plantago Psyllium*, *Plantago arenaria* and *Plantago Cynops* are compared as to physical characteristics, histological details, relative weight and mucilage swelling capacity

It was found that most of the samples of commerical Spanish Psyllium examined by the author were yielded by *Plantago Psyllium*, a few by *P arenaria*, that most of the recent French Psyllium samples were yielded by *Plantago arenaria*, a number of *P Psyllium*, while occasional lots represented varying mixtures of *P Psyllium P arenaria* and *P Cynops* It was also ascer tained that the seed of *Plantago lanceolata*, described by the author in a previous article is being offered to the American trade both as Spanish Psyllium and German Psyllium as well as torrefied abroad and mixed with untorrefied seed of *Plantago arenaria* and offered in this combination to the French and American trade as French or Black Psyllium Seed

ADDRESS OF THE PRESIDENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

BY C THURSTON GILBERT

Mr Chairman, Members of the National Association of Boards of Pharmacy and Guests

It is my duty and also a pleasure to address you as your president on the thirty-first anniversary of our Association This honor befalls few men and comes but once during the span of life

We are privileged to meet in the greatest Capital on earth, the city that has imbued one hundred and twenty million people with hope of a *New Day* and a *New Deal* Washington is the one city that every American longs to visit The historic, scientific, governmental, judicial, political and economic phases of our daily life are all exemplified here We are particularly fortunate to meet in Washington at a time while Congress is in session, which presents the opportunity of witnessing its activities from the galleries of the House and the Senate

C T GILBERT

It is customary for the president to present to the membership an outline of the activities of our Association for the year entrusted to his stewardship It has been my endeavor to carry out these duties and responsibilities in a manner that would best serve our Association I hope in this particular that I have given satisfactory service My administration has been short, owing to the change in the convention date Therefore, I shall not burden you with a lengthy address but shall confine myself to the more important matters only

AMERICAN INSTITUTE OF PHARMACY

On Wednesday morning the pharmacists of this country will dedicate the greatest monument that has ever arisen to glorify our profession After many years of careful study and planning, Pharmacy now has a *Home*, truly representative of our profession and of which we may be proud—a source from which our centralized efforts in the future may emanate It will be the high privilege of those present at this convention to witness the dedication of this temple of Pharmacy

ASSOCIATION ACTIVITIES

For several years past, our organization, not unlike other associations, has been confronted with a lack of capital to carry on the several activities which we had undertaken to keep pace with the rapidly changing conditions affecting pharmaceutical education and registration We have had to curtail some of these activities until the economic situation returns to normal We all feel that this time will come soon

Like individuals, business men and other associations, we have had to readjust ourselves to a greatly reduced income During the past ten months, we have demonstrated that this can be done, for we have carried on the most essential activities without drawing on our capital account From present indications, we shall close our fiscal year on June 30th without a deficit The reports of the Executive Committee, the secretary and the treasurer will give you the details We have had to leave some things undone that I should have liked to have seen done but, in common with the rest of the world, we are learning some valuable lessons

More of the business details will be covered in the report of the Executive Committee by Chairman W M Hankins The mid-year meeting was again omitted, the annual meeting of the Committee being held here in Washington just prior to the opening of this convention

No association can function successfully as a national organization through its officers alone Although this has been a short year, your president has found little time for anything else than the affairs of the Association However, at this time, I wish to pay special tribute to the many Committee chairmen, District chairmen and fellow officers for the loyal and whole-hearted cooperation that they have displayed It is this loyalty and this devotion that has made the N A B P one of the outstanding organizations in Pharmacy

DISTRICT MEETINGS

My first thought in assuming the presidency was to impress upon the membership the necessity for and importance of district meetings The loyal response which I received from the vice-presidents in response to my appeal for meetings has been most gratifying to me Eight of the nine districts promised a meeting for this year, and these meetings would have materialized were it not for the fact that the early date for our annual meeting upset the plans of several of the districts that had made plans for meetings in April or May These plans were abandoned so as not to interfere with convention attendance

On March 12th and 13th, I had the pleasure and good fortune of attending the meeting of District No 2 in Baltimore, and on March 14th and 15th, the meeting of District No 1 at Boston Certainly no person who listened to the programs developed at these meetings could be otherwise than impressed and encouraged by the high purposes and aims of these meetings

On March 21st and 22nd, District No 6 held a meeting at Fort Worth, Texas, on March 26th and 27th, District No 7 met at St Petersburg, Florida, and on April 16th and 17th, the first meeting of District No 8 since 1924 was held at Salt Lake City, Utah

One of the encouraging things about these meetings is the ever-increasing numbers who attend Each year the interest manifested in these meetings swells the attendance record to a new high point

LEGISLATION

Comparatively few state legislatures were in session In addition to the few regular sessions, there were a number of extraordinary legislative sessions

The primary aim of this Association in so far as legislation is concerned is to have the pharmacy law of every state in our nation require college graduation for entrance to board examinations It has taken nearly thirty years of patience to achieve the high standards under which we now labor, and at this time only eight states have not as yet enacted college requirements We should therefore lend every effort to assist these member states in enacting this very necessary and desirable legislation

Other states have college prerequisite laws that are not satisfactory, as they require only a year or two of attendance at a recognized college instead of graduation from the four-year course now prescribed by the Syllabus These states should also endeavor to amend their laws as soon as is expedient

In the past, we have had success by setting a certain date as the goal when a certain thing shall be accomplished

> *Therefore,* I recommend that every member board at present without a college *graduation* requirement immediately and seriously undertake to work for the enactment of such legislation, setting the year 1940 as a goal when every board shall be operating under a compulsory graduation requirement

Again it is the duty of the president to remind the membership that there are forces constantly at work for the consolidation of boards of pharmacy with other professional and even occupational boards into licensing departments or bureaus This type of legislation should be fought vigorously by our boards when it is proposed, also soliciting help from the other professions that are involved In states where consolidation has already been accomplished and is not functioning satisfactorily, every effort should be made to separate the Pharmacy Board from such ties Protection of the public welfare is the first duty of the Pharmacy Board and when the system under which the board is operating places the public welfare in jeopardy, then it becomes the duty of the board to call attention to the condition so as not to become a party to the act

The N A B P having gone on record as favoring the abolition of the grade of *Assistant Pharmacist* certificate should take a further forward step by outlining a definite plan for accomplishing this Strong opposition should be made to any attempts to grant a higher grade of license to assistant pharmacists by legislative amendment than that originally intended "Professional service cannot admit graded responsibility"

> *Therefore,* I recommend that the Legislative Committee be instructed to make a study of the problem of abolishing the assistant grade of certificate under the various state laws and present a definite outline or uniform plan for accomplishing this, without granting to the holders of outstanding assistant licenses any privileges other than those originally conferred by the law

RECIPROCITY

Each year the president devotes some time in his address to this subject And the theme is usually *Tolerance,* as it rightly should be The benefits of reciprocity have again been proved this year by the slow but steady increase in the

number of applications issued, thus providing pharmacists with an opportunity to practice their profession under more favorable conditions and habitats during these changing times of economic readjustment

Possibly at no time during the existence of the N A B P have more friendly relations between the member boards prevailed Reciprocity is in effect between all the states except California and New York, also with the District of Columbia, Alaska and Puerto Rico—a total of 49 active member boards Inasmuch as both New York and California are college prerequisite states, they should become active members of the N A B P May these two great states, separated by the broad expanse of our country, soon answer the call and join with us in our problems and joys Our responsibility is to make every effort to get them to join the ranks of this great *National Association of Boards of Pharmacy*

PROFESSIONAL PHARMACY

It has been decreed, and properly so, that Pharmacy shall be classified as a profession Certainly the work as taught in our colleges is professional Now that we demand four years of college and offer a degree in science in Pharmacy, the time has come to develop a wider field of professional practice

We are all familiar with the complaint that there are too many commercialized drug stores and that the graduate has difficulty in finding employment in profes sional pharmacies May this condition not be due to the fact that for many years we have been registering as pharmacists persons whose only credentials were four years of training in a more or less commercial store? The very fact that our graduates are looking for professional openings is an indication of what we may expect in the future I therefore feel that this Association in cooperation with the AMERICAN PHARMACEUTICAL ASSOCIATION should lend them encouragement by making every effort to develop more professional pharmacies The strictly pro fessional pharmacy is already flourishing in the larger centers But we need the same type of pharmaceutical service in the smaller centers which cannot support it without adding some commercial lines If a high standard of professional service is rendered and stressed, there can be no harm in limited merchandising of allied lines The N A B P has an opportunity to perform an important service for both phar macy and the public by defining and designating pharmacies that can be safely entrusted to render such service

PHARMACY EXHIBIT CENTURY OF PROGRESS

Pharmacy received its major publicity of this age the past year at the Century of Progress in Chicago This exhibit was visited by millions of people from every corner of the globe and was invaluable in stressing the service pharmacy renders in the field of public health The exhibit is to be continued in 1934 and its value further extended

This Association should feel particularly proud that the man whose efforts made this exhibit such an outstanding success is one of its officers Mr Christen sen has already been honored for his work in behalf of the exhibit but will receive greater mention as the years go on and the value of the exhibit is realized Every pharmacist in America owes it to himself and to his profession to visit the exhibit before the Century of Progress passes into history

HOME OFFICE

Those members who have not visited our home office should avail themselves of the opportunity whenever possible Only those who have done so can visualize and appreciate the amount of work that is handled there each day and the competent and efficient manner in which thousands of inquiries are dispatched The home office is a place where all of us have access to statistical data on all phases of the profession which it has taken many years of labor and study to compile The information is available to those who ask for it

The personnel is of the highest efficiency and can at all times be depended upon to give the maximum of service They are to be commended for the work they are doing for Pharmacy and the Association

IN MEMORIAM

Each year it becomes the sad duty to report the names of our beloved members that have laid down their tools and answered the call of Him who reigns in the place from whence no man returneth Death must come to all of us During the past year, the following members have passed into the Great Beyond

Thomas C Coltman, Colorado
Oscar C Draper, Delaware
John E Jackson Virginia

CONCLUSION

I now wish to express my deep appreciation to you for conferring upon me the highest honor within your power to bestow—the presidency of the National Association of Boards of Pharmacy

I have tried to serve you in a manner that would reflect credit upon the Association which is nearer to my heart than any of the multitude of bodies with which I am affiliated

If I have been successful in only a small way and have contributed something to the upbuilding of the N A B P , I shall feel well paid for my efforts

To my successor, I wish a full measure of success and happiness, and I pledge him my loyalty and support in his administration of this high office

To-morrow, when I lay down the gavel of office and return to the ranks, I will deem it a pleasure and a privilege to continue to work for the lofty ideals of the National Association of Boards of Pharmacy

---

ABSTRACT OF PAPER PRESENTED BEFORE SCIENTIFIC SECTION A PH A , WASHINGTON MEETING 1934

"The Stabilization of Syrup of Ferrous Iodide U S P X ' by William J Husa and Lyell J Klotz

A study was made of the mechanism and rate of decomposition of ferrous iodide solutions and syrups The decomposition involves a partial hydrolysis of ferrous iodide oxidation of iodide ion and oxidation of iron The oxidation of iodide ion was found to be a reaction of the first order with a specific reaction rate of $3\,2 \times 10^{-5}$ An intensive study was made of the deterioration of Syrup of Ferrous Iodide U S P X It was found that a stable syrup may be prepared by using dextrose in place of sucrose

ADDRESS OF THE PRESIDENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

BY L D HAVENHILL

Last August, in Madison, when you chose me as the recipient of the highest office that this Association has to bestow, I can assure you that no one could have been more surprised than myself

To serve as your president has been not only a great personal honor, but also an honor to the school which I represent I desire at this time to express my appreciation of the hearty support that the members and officers of this Association have given me during the past year

In accordance with the provision of the constitution of this Association that the president shall present an annual address, I have chosen as my subject, "The Education and Training of the Modern Pharmacist"

Thirty-four years ago to-morrow, May 8, 1900, the founders of this Association, numbering twenty-one charter members, met in Richmond, Virginia, and organized the American Conference of Pharmaceutical Faculties Ten years later, in May, the Conference again met in Richmond, five members stronger at the end of the decade than at its beginning Ten years later, also in the month of May, we met for the first time in the city of Washington At this time our membership had increased to forty-five In 1930, May was again chosen as the month of meeting, but this time Baltimore was the favored city Our membership had increased to fifty-seven

L D HAVENHILL

Now, after four additional years of rambling, we are, after an absence of fourteen years, assembled in the city of Washington for the second time Our membership still numbers fifty-seven, which, considering the four trying years, I feel augurs well for the continued development and stability of pharmaceutical education

I am glad that it is our good fortune to be in the nation's Capital again in this glorious month of May For somehow, whether cold or rainy, or radiant with the warmth and gladsome sunshine of Spring, May outstrips all of the other months of the year as an auspicious time for annual reunion

We have come back to a new and more beautiful city of Washington and fortunate indeed are we who are privileged to attend this thirty-fifth annual meeting and witness the dedication of the now realized dream of American Pharmacy—the American Institute of Pharmacy

As we look back through the vista of more than a third of a century, we are saddened to note the rift in our ranks caused by the passing of so many pioneers and early workers in the cause of pharmaceutical education If my information is correct, Dr Edward Kremers is the only member now with us who was present at

the memorable first meeting in Richmond, Virginia, thirty-four years ago, who has maintained an uninterrupted directorship of a member college Time has whitened his hair but has made no impression on his indomitable will and purpose to carry forward the campaign for a finer and broader pharmaceutical education which he began so long ago

After many years of aggressive planning this Association has finally reached a place in its educational program upon which truly to build a profession of pharmacy The minimum four-year course is at last a reality and I believe has come to stay permanently in one form or another While the development of the four-year course has been slow, its progress has been steady In 1927, at the time of its adoption, few, if any, of our members anticipated the financial situation that we would be facing in 1932 Many readjustments have been necessary and one might be pardoned for believing that 1932 was an inopportune time for the inauguration of this important step in our program of educational expansion

We are in the midst of a world depression and by way of depressing you still more you may recall that I sent you a questionnaire, not too lengthy a one I hoped, to answer I should like to consider with you for a few minutes some of the answers to the questions which I here propounded Let me first thank you and say that the responses I received were unusually prompt, frank and complete Such a response is remarkable and can only mean that those in authority appreciate the meaning of cooperation and are willing to give their time in whatever way appears to be helpful to the Association

The replies to the first part of Question 1, "Has your school been seriously handicapped by diminished financial support?" were as follows eleven, yes, fifteen, to some extent, twenty-eight, not seriously District No 9, the Pacific Coast states, as a group were the least affected, all reporting that they were not seriously handicapped

The replies to the second part of this question, "If so, how have you met this situation?" indicate that the condition has been met to a great extent by salary reductions ranging on the average from 8 to 20 per cent but in some cases reaching 50 per cent Strict economy is being practiced and many items from the customary budget such as traveling expenses, advertising, special printing, library funds, research, new buildings, special apparatus, assistants, etc , have been either greatly reduced or eliminated In a few instances the decreased salary budget has necessitated dropping some junior members from the faculties Compensating factors have been funds and equipment in reserve, gifts, increased tuition and to some extent decreased enrollments

Many of the schools reported that their resources were diminishing and that drastic retrenchment would be necessary if present conditions were to continue over a period of several years With the decided upward trend in the cost of laboratory necessities now manifest, this concern may become real, indeed, to all the schools It is perhaps timely for an older member, for whom this is not the first depression, to remind the younger ones that many wonderful achievements and many brilliant scientists in the past have issued from laboratories in which the equipment was meager indeed Necessity, said to be the "mother of invention," may in the near future develop some talent in our student-body which otherwise would perhaps have lain dormant

Inspiring and resourceful instructors will triumph over whatever befalls A striking feature was brought out in these replies, that I believe illustrates in a vivid way the professional spirit of pharmacy, a spirit that one could wish was more in evidence elsewhere in the world to-day, was that the faculty members in general accepted deeper cuts in salary in order that funds might be available to secure essential equipment and instruction for their students

One of the most serious situations that may arise in the larger institutions of learning will be an attempt at reorganization under the guise of economy in which the school of pharmacy will be merged with other larger schools or departments and thus be deprived of its autonomy and professional organization Some six or more schools have already changed or are contemplating changes in their organization It is to be hoped that none of these will result in conditions that will be inimical to the best interests of pharmaceutical education A recommendation, therefore, is offered to the effect that this Association view with disfavor economies of this kind and that the chairman of the executive committee register vigorous protests to any and all instances of this character

A classification of the replies to Question 2, "If you have suffered a decrease in enrollment, especially of freshmen, in the past two years, to what do you attribute it?" indicates that thirty-four schools had a decrease in enrollment amounting to 30% or more in some instances Eight schools had maintained their freshman enrollment and twelve schools had an increase in freshman enrollment, especially in 1933 In some cases this increase was more than 100%

The depression was generally blamed for the decreased enrollment, but local conditions, increased tuition, acceptance of only approved high school graduates and lack of full support by the respective boards, were also causative factors

It was inevitable that the four-year course should be held responsible to some extent, especially when the increased length of the course is considered in the light of unfavorable business outlook, and the financial embarrassment of prospective matriculants However, only six schools believed that it was more than indirectly responsible and sixteen schools reported specifically that as a causative factor it was negligible

The answers to Question 3, "Is there active opposition to the minimum four year course in your state and if so, from whence does it emanate?" should be received by this group with considerable satisfaction Forty schools report no opposition Several of the schools that adopted the minimum four-year course prior to 1932 report that they are now actively supported by the pharmacists and the boards This should serve to encourage those schools that did not adopt the minimum four-year course until 1932 and that are at this time facing the expanding curriculum with decreased enrollment and a decreasing income Fourteen schools report some active opposition from board members and individual pharmacists who seek pharmacy only as a trade, also from financial backers and alumni of some competing schools whose standards are below those of the A A C P

The replies to Question 4, "From what sources do you encounter the greatest inertia in the operation of the minimum four-year course?" indicate that the program is neither wholly nor graciously accepted by druggists who might be characterized as follows Those who fear they will have to pay more to their clerks, those who have no appreciation of the value of an education, those who have failed

to note that the apprenticeship system began to lose its effectiveness one hundred or more years ago, and from the "has-beens" of the non-professional type

The response to Question 5, "Kindly give me all the information possible concerning 'cram schools' and other schools having requirements for entrance and graduation below the A A C P requirements, that are functioning in your state or immediate territory," indicates that there are a number of the so-called "cram" schools still functioning They necessarily derive most of their support from the states where only drug store experience and the ability to pass the board examination are required of registered pharmacists There are now, according to report, only eight states without a college prerequisite (Arizona, Massachusetts, Missouri, Nevada, New Hampshire, New Mexico, Tennessee and Vermont)

Recent printed matter issued by one of these "schools" in the Middle West, states that it has enrolled more than five thousand students since 1910, one thousand of whom were enrolled between 1929 and 1932 The explanation for this sharp rise in the attendance curve is that most of the boards in the district have announced a college prerequisite to take effect in the near future It is reported that this school is a one-man, one-room institution without equipment, term six weeks, tuition one hundred dollars payable in advance and non-returnable

There are ten schools listed in Guidance Leaflet No 14 which are not members of the A A C P, and a private school and college directory lists a score or more additional ones Apparently, there has been but little change in the total number of pharmacy schools since the list compiled by Prof W L Scoville and published by the American Conference of Pharmaceutical Faculties, in 1905

That there should still be schools that do not meet the A A C P standards, offering pharmaceutical instruction in any of the states is indeed unfortunate for professional pharmacy Surely the supporters of such instruction have given but little serious attention to the mass of material collected at considerable expense in time and money and rendered available as *Basic Material for a Pharmaceutical Curriculum* The material in this book ought not to be restricted to curriculum builders It is valuable for every one who believes in professional pharmacy and wishes to encourage it There should be a copy of this book in every drug store—at least 65,000 copies, readily available for study and reference—but the fact is that after seven years less than 1% of this number are in use

When the question of adopting the minimum four-year course was before this Association in 1928, numerous advantages were argued for and against it Those schools which had already adopted this course were unanimous in their endorsement To ascertain, if possible at this early date, if opinions had changed, Question 6, "What are the advantages so far gained by the four-year course?" was submitted Forty-six schools reported distinct advantages, two reported that it was too early to offer an opinion, one saw no advantage so far, one reported a distinct disadvantage, but without comment, four did not report

A few of the more frequently mentioned advantages were time for more thorough work in each course, better morale, the broadening outlook, better sequence of a study, students show more of a professional attitude, a standard instead of a substandard course, fewer transfers of students to other courses, pharmacy has been dignified in university circles, fits students for a wider service

Several deans, who had previously questioned the advisability of the mini-

mum four-year course, freely admitted that they were completely won over to the new program The combination of college education and professional training is meeting with general approval One dean, who is regarded as a pioneer in the field of higher education, writes, "The principal advantage we have found growing out of our minimum four-year course is the increasing recognition—even among our conservative pharmacists—that pharmacy needs men of better training, caliber and character "

Questions 6*a* and 6*b* were submitted particularly because of their bearing on two important advantages that it was hoped would be gained through the adoption of the four-year course To the first part of this question, "Have better qualified students matriculated?" thirty-eight deans answered yes, in positive terms, nine answered no, without comment, five qualified their answers in such a way as to indicate that their matriculants in former years had been well qualified and two expressed no opinion

The answers to the second part of this question, "Has it established an assured feeling of equality with students in other departments?" were as follows thirty three, yes, nine, that the question did not apply because they were independent schools, seven, that this question had not been a problem with them, two, not completely, two, no, but one offers in explanation, "We are associated with five and six-year professional colleges and still are the short term school " Certainly, no more sweeping vindication of the four-year course can be offered than the answers to these three questions

The introduction of the four-year college course in pharmacy, I fully believe marks the greatest and most important forward step in pharmaceutical education that has taken place in the last quarter of a century I say this in a very emphatic and positive way and see no reason for modifying this statement in any particular There are numerous reasons for believing that this is so In the first place, it definitely elevates pharmacy to the rank of a profession, taking it permanently out of the vocations and class of manual trades Again, it tends to bind medicine and pharmacy into a closer union than has ever before been possible because, in addition to giving the pharmacist a good professional training it provides time for considerable non-professional and cultural study and thereby places the pharmacist virtually on a par with the physician so far as general education is concerned The pharmacist can now meet the physician on a plane of intellectual equality and demand respect for his opinions not only on matters involving drugs and drug therapy but on any of the general problems affecting private, community and national health The first real step in bringing pharmacy and medicine into professional union has now been taken and the consequences of this step, as well as its importance for pharmacy, is well nigh inestimable

A number of deans responded to my general invitation for comments and observations on the four-year course These responses should not remain buried in my files and I wish to present some of them to you as quotations I am indeed sorry that time prevents mentioning more than a few of the excellent replies that I have received

"I am glad we have the four-year course If I had it to do over again I should do whatever I could to promote its cause "

'The four-year course and curriculum as per Syllabus will attract a higher grade of students

who will, on graduation, have a better cultural background, and be more professional minded and, on the whole, a credit to the profession of pharmacy Formerly, only an occasional one would rise to such a high standard, and this was usually due to superior educational background before entering pharmacy school or college

'We are well satisfied with the four year course in this state "

"I realize very thoroughly that a four year course seems to be somewhat excessive considering the kind of stores that possibly the majority of our students will go into after graduation but I believe and sincerely hope that this is one way of raising the standards of pharmacy throughout the state "

'We always regarded pharmacy as the chief medical specialty and have continuously maintained that pharmacists should be educated upon an academic qualification equal to that required by medicine Other professions are now exacting the same previous academic training that medicine requires Our schools of Dentistry Education, Business and Law require the same preparation for their respective technical work that medicine requires of students before they are admitted to medical subjects Why should pharmacy occupy in a university a position inferior to any other school or profession? We feel there is no valid reason and all our endeavors in our struggle for advancement have been based upon that conviction Pharmacy is a division of public health equally important with dentistry and certainly nearly as responsible as medicine That pharmacists should be less qualified than dentists or physicians seems out of the question with us "

"I have a very definite feeling that the establishment of the four year course will result in a much more secure position for the profession of pharmacy both by the laymen and our sister professions of medicine and dentistry '

We knew of course that there would be a few lean years but so far as I am able to determine there is not a man among us who would consider going back to the old system "

I believe that our school has a better standing to day in the state than ever before We are putting on a part of the program for the state convention this year and in fact I feel fairly well encouraged in both the Syllabus and the four year course "

' I am very much in favor of the four year course in pharmacy I believe this will decrease the number of graduates in pharmacy, but increase the qualifications of the graduates I also believe it will have a tendency to instil a greater appreciation in the graduate for his profession increase the professional side of pharmacy and decrease the general merchandising which in my opinion is retrograding our profession at the present time

' Judging from our experience in the last four years I believe that the benefits that have been accrued by graduates of the four year minimum course in pharmacy more than outweigh the difficulties encountered "

The fourth edition of the Syllabus, which is intended to indicate subject matter for use in building the four-year curriculum, has now been available for a little more than a year Each of the preceding editions of this book has served in turn to lead the way for the adoption of longer and broader courses of study This one is destined to bring about greater uniformity and stability Eventually its provisions should be written into the by-laws of this Association to become a part of the qualifications for membership

It must be borne in mind that changes come about gradually and that it takes years of tireless effort to develop suitable and acceptable standards Take for illustration, the U S P which, though revised with great labor every ten years, was accorded no official standing for more than eighty years It will not require so long a time, let us hope, for the A A C P to officialize a Syllabus However, it would seem to be a little premature for the Association to attempt this step until the provisions of the Syllabus have been critically observed during at least one complete four-year cycle

Bearing on this general subject, the next and last question, "What is the re-

action of your faculty to the new Syllabus?" has brought forth many significant replies On the whole, these show that the various faculties are giving the Syllabus careful study Several of the deans have provided each member of the staff with an individual copy The appearance of the Syllabus at the time when the new course of study is being inaugurated has proved helpful in many ways and its merits as a suggestive outline have not failed of recognition This Syllabus, as one member expressed it, "is the best ever and furnishes an excellent preliminary working basis" Twenty-two replies indicated that the faculty reaction to the Syllabus was favorable, twenty were to the effect that some modification would be necessary, eleven reserved opinion

From the comments received, it is evident that further discussion of the courses in the Syllabus is advisable There is a desire to have the list of basic subjects extended to include at least psychology and sociology, political science and more in the English group The advisability of making mathematics and economics required and biological assaying optional was questioned Commercial pharmacy and physical chemistry were suggested as additions to the professional and applied subjects Regret was expressed that outlines for basic subjects were not included No one expressed a desire for the elimination of any of the courses

A considerable number of faculties are experiencing difficulty in adhering closely to the prescribed outlines They expressed the belief that rather liberal modification will be necessary in order to meet local conditions This was particularly noticeable in the replies received from state-supported schools A minimum of revision should make this Syllabus acceptable I would recommend that this problem be assigned to the Committee on Curriculum and Teaching Methods and that this committee be increased from five to ten members

Before I leave the subject of the Syllabus, I wish to express my surprise that the slow sale of this book, reported last summer, still continues Dean Beard informs me that only a small number of the state board examiners have purchased copies The material in the Syllabus ought to appeal to all the members of every state board of pharmacy Here is an opportunity for our faculty members of the Committee on Relations of Boards and Colleges, if they have not already done so, to render service to pharmacy by starting discussions concerning the application in professional pharmacy of the different courses outlined in the book The chapter pertaining to the use of the Syllabus by the state boards in preparing their questions is also worthy of an afternoon or evening's discussion

As has been stated before, the introduction of the four-year college course in pharmacy marks the most important forward step in pharmaceutical education during the last quarter of a century Some very pertinent questions arise which demand judgment and discussion What distribution of time and study is best and wisest during this four-year period? How shall the professional and non professional courses required be related to each other? Can the rapidly advancing junior college movement, which is literally sweeping certain sections of our country, be used to advantage in furthering pharmaceutical education?

Heretofore we have had little occasion to take cognizance of a new educational unit such as the junior college This is a great educational experiment which had its practical beginnings in the first decade of this century The *Junior College Journal* of January 1934 contains a directory showing a total of 514 colleges with

a total enrollment of 103,530 students The Atlantic Coast states have only a small number of these colleges, but in the South and Middle West they are growing steadily in importance There is distinct evidence, also, that this is a healthy growth

About 90 per cent of these junior colleges are accredited in state universities through a committee chosen for that purpose, acting as the accrediting agency The standards to be met are the same as those for the first two years in any high-grade four-year college

The universities directly concerned with junior colleges in their own states have for the most part shown a commendable spirit of cooperation Naturally some of the older universities have been indifferent or adopted the policy of suspended judgment to the whole junior college movement This attitude can be only temporary, however, for the importance of this educational change will soon be felt throughout our entire educational system

The curricula of most of the accredited junior colleges are modeled upon the first two years of university work The junior college period may become an important unit for pre-professional training E D Chadwick, in a survey of the junior colleges of Minnesota, gives a list of pre-professional curricular offerings which includes one for a year of credit in pharmacy schools These junior college graduates are coming to the universities in increasing numbers Many now feel that one year of pre-pharmacal work in a junior college is entirely feasible, but two years of this work has been suggested Can such a plan be successfully carried out? There is reason to believe that it can

A great amount of so-called pharmaceutical education is not professional in character, and institutions other than colleges of pharmacy can impart this information quite as well, perhaps better at times, than can the regular school of pharmacy If the professions of medicine and law find it possible to take advantage of junior college training in fitting their students for later professional study, it would seem that schools of pharmacy were taking themselves all too seriously if they insist that this part of the education of the pharmacist can only be carried out successfully under their direct observation and guidance

The very first requisite of a professional man has always been, and I am quite sure always will be, that he be a liberally educated individual and that in addition to possessing professional knowledge he should also be equipped with broad and extensive non-professional information This is doubly true for the professional man of to-day for only on a broad and liberal foundation of non-professional information can the complex superstructure of modern professional study be built The professions of law, medicine and the ministry, to mention only a few, have come to recognize this as an established fact and are to-day insisting on a long period of general, cultural or non-professional study as a very necessary prerequisite to real professional training in these fields

No professional school can ever hope to teach all that its students need to know in later life College training must seek rather to instruct the student how to read the permanent written record of man's achievement accurately and intelligently and how to proceed from the known to the unknown, once general principles have been laid down and mastered For a well-prepared student there need be no special kind of inorganic or organic chemistry, no English, botany or biology

especially adapted to this or that professional student Subjects such as these are all prerequisites to pharmacy as well as to the other professions and should be so considered A well-equipped junior or university college should be able to teach these subjects quite as well as the very best professional school We should not become too sentimental about prerequisite studies except to see to it that they are given by properly trained individuals Let us make our schools of pharmacy real professional schools devoted strictly to the professional aspects of pharmacy and leave training in the prerequisites to others to carry out

The modern intellectual development of any young man or woman falls quite naturally into two main divisions, *first*, a non-technical, non-professional, so-called cultural part, and *second*, a technical or purely professional part We might very properly divide the four-year course in pharmacy into two equal biennial periods The first period should be devoted to the acquisition of purely cultural subjects together with the necessary prerequisites for later pharmaceutical study This may be taken in an accredited junior college or in the first two years of a college of pharmacy offering a complete four-year course The second two years could then be devoted to an intensive and concentrated attention to the professional content of pharmacy, stressing not only the scientific side but also the economic or business side A program of this sort is in line with practices in other professions, and the sooner we enter their company and adopt their point of view the sooner we shall enter into our professional birthright and take our proper place with the professions of medicine and dentistry in helping solve the great problems of health and disease which are so very fundamental and important to our age in civilization

---

ABSTRACTS OF PAPERS PRESENTED BEFORE SCIENTIFIC SECTION, A PH A WASHINGTON MEETING, 1934

"Penetration of Volatile Oils and of Fixed Oils and Fats through the Intact Skin" by David Macht

A number of powerful pharmacological agents were incorporated into various fatty bases employed for making ointments, and their penetration through normal intact skin was studied by observing the effects produced by absorption if any of the drugs In another series of experiments various volatile oils, as well as some of their active chemical isomers were similarly used Constituents were applied directly to the skin, and absorption phenomena were studied and compared This research is of importance in connection with the use of various vehicles for the incorporation of active drugs to be applied to the skin

The Assay of Chloral," by Donald C Grove Edward M Hoshall and Glenn L Jenkins

The present official method for the assay of Chloral is shown to be inaccurate A method is proposed which is based on the conversion of the chlorine to chloride in a simple pressure bottle and a determination of the resulting chloride by argentimetric methods

Some Observations on the Stability of Quinine Sulphate during Storage," by L E Warren

Seven packages of freshly prepared quinine sulphate were stored under conditions simulating those obtaining in prescription dispensing The packages were opened at varying intervals and small portions removed from the surface of the material without disturbing the remainder The intervals from opening to the time when the product became stable (ceased to lose weight) were recorded In a climate comparable to Washington D C , the salt progressively loses water of crystallization until after 4 to 12 months it contains about two molecules (4 6%) after which it remains practically stable

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE A A C P, EDITOR OF THIS DEPARTMENT

PRESCRIPTION INCOMPATIBILITIES AND THEIR PROBLEMS FROM THE TEACHING STANDPOINT

BY RALPH E TERRY *

(*These articles continued from page 364 April Journal*)

From the teacher's standpoint, the presentation of the subject of Prescription Incompatibilities has many problems There are three outstanding factors which warrent discussion at this time These may be termed Time, Content, Method

Time—This factor might be subdivided into two distinct units, placement in the course of this subject and the amount of time allotted to the study of the subject Time in relationship to placement in the course needs very little mention for universally the study of Prescription Incompatibilities is reserved until the final term This is as it should be and no attempt should be made to introduce it at any earlier period even as a so-called "student interest" bait The fact that this is the most technical of all the courses offered in the Pharmacy curriculum demands the completion of the basic subjects There is also the possibility of confusing the student by applying some of the facts before he is well grounded in the fundamentals

Another important factor of *Time* is the question of how much time is to be allotted to the work Again differences in what should be taught as part of the course will cause considerable differences in time devoted This question of *Content* is to be discussed later, but a basic quantity of time should be assigned to the work A minimum number of clock hours might be specified, however, and it is hoped that during the discussion of this problem some opinions may be expressed on this question

Content—While the question of incompatibilities may be stated as a relative thing, there is no doubt but that certain reoccurring difficulties do arise To the novice almost any formula has possibilities of trouble, experience shows the way to avoid these hitches Therefore, in the teaching of the subject, we are facing two distinct phases, *first*, we must carefully arrange the exercises in such a way that they are of a progressive nature, and *second*, these should be of a practical nature where possible Progression can be secured only by careful selection One of the best devices to start out the work is to use an exercise which the student has previously completed in the regular work, and by restating the formula in slightly changed wording, profit by the student's experience Many times this "carry-over" will be disappointing to the teacher, but the student will recall the earlier exercise when the instructor explains it and there is an important feature here not to be overlooked, that of a repeated experience And all learning is simply repeating experiences until they become habits Therefore, the device of starting the subject on a familiar base should be used

* University of Illinois

The question of stating the problems as practical formulas will not always work since there are times when the facts can be better studied if the formula be stated in the theoretical manner Here again the possible carry-over from the previous subject should not be overlooked As an example, a formula calling for eye drops of silver nitrate in normal saline solution presents the old qualitative reaction dressed up in a pharmaceutical cloak And so there are a number of such reactions which might be used as starting points, carrying over into the new work facts learned early in the student s work and therefore more easily brought to mind

On the other hand, at times student interest can be aroused to a higher pitch if the problem is stated in practical language Then, too, the actual translation of laboratory experience into practical life is made easier if the applications are kept in mind at all times

One more important possibility in relation to *Content* of course, since this subject is taught at a time when the basic subjects have been covered, and since the study itself makes use of many of the facts previously learned, the teaching of prescription incompatibilities offers a wonderful opportunity for reviewing a large number of courses Here again is an opportunity to arrange the work in such a manner as to cover the basic subjects, yet the course should not degenerate into a mere review study

Method —Method is the most important of all the factors A good teacher with a well worked-out method can present a subject of inferior content and get better results than another instructor blest with a much better course content And *Method* should be made up of the following phases the materials, desk space, a text or manual and a goodly supply of teacher's time and energy This latter can not be over-stressed for if there is any place in the modern system of instruction where the old-fashioned preceptor method has a place it is in this particular study A few suggestions as to the best method, a careful supervision of the work, and then a short discussion following the completion of the exercise will do more to assist the student than any other system Here is where true teaching ability shows, some students need only a small amount of help Others need very careful and complete supervision, and when possible they should have it On the other hand they should not be too completely dominated since the loss of independence of action would be very undesirable Therefore, this feature must be carefully adapted to the individual student

Under a discussion of *Method,* a very important discussion is that of using the proper formulas In a previous paper, the use of small amounts of materials was outlined For the study of the theoretical phases of the subject, this is perhaps the best manner, but as a practical course, the use of "full-sized" formulas is urged Thus the student is confronted with the problem as he will see it in later work and by solving the laboratory problem he gains the confidence for his future work This is the important part of the course in Prescription Incompatibilities

SUGGESTIONS ON TEACHING A COURSE IN INCOMPATIBILITIES

JOHN S MITCHELL *

It seems there is always some controversy concerning the methods used and their procedure in teaching a course in incompatibilities in prescription writing

* Howard University

When one observes the varying results obtained from the compounding of a simple formula, he concludes that there is yet need for a more unified idea concerning that art which is the fundamental act of the practicing pharmacist

Now that the four-year course in pharmacy is going into effect, a better opportunity for broadening the course in incompatibilities is made possible Two major arguments, as to how a course of this kind should be taught, are given There are those who think a course of one lesson an hour a week, in the second year, is sufficient This one-hour period of course supplemented by a one-hour period of laboratory work Others reduce the time to one semester's work In either case there is the fault of the student memorizing the prescriptions to be discussed for that period, only to forget them and take new ones at the next meeting of the class Here the results are frequently disappointing, since sufficient time has not been given to the subject

There are those who feel that a more intensive course, consisting of one semester's work having two lecture periods and two laboratory periods a week, be given In the new four-year course outlined for the pharmacy student this idea seems a better one The student received a more intensified drilling and is able to recognize and adjust more readily the incompatibilities that are presented

The number of textbooks written on the subject are few However, it is not necessary to confine one's teaching to a specific book In either case the student is given prescriptions and is required to search for all incompatibilities, but compound as written Having observed the physical and chemical changes involved, he then, upon his own knowledge of these transformations, selects the procedure in compounding that will effect the best result This without interfering with the chemistry or therapy of the preparation The two prescriptions are then compared and notes made for the discussion in class Criticisms should be invited from the fellow students, enabling the instructor to have a better conception concerning the clearness of each problem in the student's mind

Frequent quizzes might be given Because in his course in Practical Dispensing the student is daily compounding, he constantly becomes more thoroughly acquainted with the many changes involved in the process of his operation This, of course, develops him in technique and stimulates in him clearer ideas concerning the art of prescription adjustment

HOW INCOMPATIBILITIES SHOULD BE TAUGHT AND HOW MUCH TIME SHOULD BE DEVOTED TO THEM?

BY D B R JOHNSON *

First, they should be taught in qualitative chemistry, showing the student at that time that every reagent used there becomes an incompatibility in dispensing If this is done by those teaching our chemistry to pharmacy students, then the chemical incompatibilities will be so well tied to the knowledge of chemistry that little more will be needed in a drug course on incompatibilities of this kind

The pharmaceutical incompatibilities should be stressed by the teacher at the time the student is carrying the galenicals and other pharmaceutical preparations In these the solvent used frequently determines the incompatibility of the various preparations

* University of Oklahoma

As to the therapeutic incompatibilities we have to deal with those drugs which when combined may create an overdose, or, when combined in the same preparation, one nullifies the action of the other This should be taken care of in the study of pharmacology, or if it be so taught, in the department of materia medica

Second, if this work has been well done as outlined, only a short course not to exceed two credit hours would be necessary to coordinate the field which I will designate as general incompatibilities

WHEN SHOULD DISPENSING BEGIN AND HOW MUCH TIME SHOULD BE DEVOTED TO IT?

First, we must consider the different state laws In some dispensing should occur or be partly taught, how to use a torsion balance, fold powder papers, fill capsules, etc , in the first semester so they will know a little of the technique when they take the Board of Pharmacy examination in the state On the other hand, a certain amount of the work, given in the first semester and continued at times in some pharmaceutical work through the entire school course, holds the mind of the student to the thing which he will be required to do after completing his course in pharmacy I think the work should parallel in a way the material that he is studying during the year in which this part of the dispensing is given

Second, as to the time that should be devoted for coordinating and completing the above-outlined course, I suggest about five credit hours or fifty-one lecture hours and approximately 102 laboratory hours for the final and coordinating part of the course

---

RESOLUTIONS AND RECOMMENDATIONS ADOPTED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION AT ITS EIGHTY SECOND ANNUAL MEETING IN WASHINGTON D C , MAY 7–12, 1934, UPON RECOMMENDATION OF THE HOUSE OF DELEGATES THROUGH ITS COMMITTEE ON RESOLUTIONS

ADDRESS OF PRESIDENT ROBERT L SWAIN

We desire to record our deep appreciation of the masterly address delivered by our president, from which we desire to submit the following resolutions for your action

No 1 Maintenance Committee, American Institute of Pharmacy

Resolved that the committees on Campaign Funds Site and Plans for the A PH A Headquarters Building be discontinued, and that a new committee be set up to consolidate the work done so far and to push on to the ultimate objective, title of this committee to be the 'American Institute of Pharmacy Maintenance Committee" and that H A B Dunning chairman of the present Campaign Fund Committee be asked to assume the chairmanship of the Maintenance Committee

No 2 Retiring President on the Council

Resolved, that the Constitution and By Laws be amended to provide that the retiring president become an *ex officio* member of the Council for the succeeding year

No 3 Chairman House of Delegates and the Presidency

Resolved, that the chairman of the House of Delegates be ineligible for nomination for the presidency during the term of his office and that this action shall not apply in any sense to the present chairman or vice chairman

No 4 Selection of Candidates for Presidency

Resolved that the By-Laws be so amended as to provide for the nomination of two candi

dates only for the office of president The committee desires to submit this recommendation to the Council for their study and proper action

No 5 Study of State Codes

Resolved that a special committee be appointed to make a thorough study of all state codes and the legislative acts under which they have been created, as many of their provisions are certain to affect the conditions under which pharmaceutical service is made available

No 6 Food and Drugs Act

Resolved, that the Food and Drugs Act be amended to include cosmetics and to bring advertising under Federal supervision and control and that no necessary power should be denied the enforcing agency, and that the public interest should be the paramount consideration On the other hand, however broad sweeping and uncontrolled powers should be withheld as unnecessary to the purposes of the Act and as inconsistent with our theories of Government Industry should not be unduly harassed but should be given every freedom consistent with the basic purposes of the Act

No 7 Distribution of Drugs and Medicines

Resolved, that the AMERICAN PHARMACEUTICAL ASSOCIATION re-affirm its time-honored position that drugs and medicines should be distributed by registered pharmacists only, and that a carefully selected committee be appointed to draft a model act to bring this condition about in every state

No 8 Study of Pharmaceutical Legislation

Resolved that the ASSOCIATION give serious study to the matter of pharmaceutical legislation and that some agency be set up to study pharmaceutical legislation so that it may be modernized and made consistent with the advances made educationally and professionally

No 9 Membership Plan

The committee desires to approve the comprehensive plan outlined in the address of the president relative to the matter of membership and further desires to recommend this for the proper consideration of the Council

No 10 Award to Pharmaceutical Publication

Resolved, that the ASSOCIATION award a medal yearly to that publication meeting a certain standard of excellence and that this medal be awarded by a committee to be entitled the A PH A Commission on Membership and Awards which committee is to be composed of the former presidents of the ASSOCIATION In approving this resolution, the committee desires to express its sincere hope that the past presidents will embrace this opportunity to advance the cause of pharmaceutical journalism

ADDRESS OF CHAIRMAN P H COSTELLO OF THE HOUSE OF DELEGATES

We desire to express our appreciation of the address of Chairman Costello, and urge that the membership acquaint themselves with its contents

No 11 Pharmacy Week

Resolved that the A PH A continue its support of the observance of 'National Pharmacy Week," and records its deep appreciation of the splendid aid given this movement by the various state associations

No 12 Publication of Proceedings of Annual Meeting

Resolved, that we record our appreciation of the promptness with which the material of the annual convention has been made available to the membership through successive issues of the JOURNAL and that consideration be given to publishing the entire proceedings of the A PH A in one issue of the JOURNAL as soon as feasible

No 13 Institute of Pharmacy Commemorative Stamp

Resolved, that we approve the adoption of a U S commemorative stamp on the dedication of the American Institute of Pharmacy and suggest that an attempt be made through a proper committee to have favorable action taken on this plan

No 14 Material for Library and Museum Institute of Pharmacy

Resolved, that the attention of pharmacists of the country be drawn to the establishment in the American Institute of Pharmacy of a reference library and historical museum These divisions are intended to collect and exhibit various materials which will illustrate the development of pharmacy and pharmaceutical literature Pharmacists of all sections are invited to contribute to the library and museum any materials suitable for these purposes

No 15 Procter Memorial

Resolved, that the Committee on the William Procter, Jr Memorial Fund be instructed to proceed with the erection of the Procter Statue in the foyer of the American Institute of Pharmacy as outlined and that in conjunction with the Council, arrangements be made for its unveiling when completed

No 16 H R 3768

Resolved that the ASSOCIATION approve H R 3768 changing the title Retail Liquor Dealers Stamp Tax to the 'Medicinal Spirits Stamp Tax," and that a copy be sent to the chairman of the Senate Finance Committee and to Senator King, chairman of the Sub Committee

No 17 Committee on Pharmacy Corps in the U S Army

Resolved, that the Committee be continued and instructed to secure the establishment of pharmacy properly in the United States Army, that is, that the opportunity for service recognition and advancement of the pharmacist in the Army shall be on a parity with that of the commissioned personnel in the Dental and the Medical Corps of the Medical Department

That the ASSOCIATION renew its request that the leading pharmaceutical organizations of America including state pharmaceutical associations, continue special committees on the establishment of and recognition of pharmacy in keeping with its professional dignity and merit in the United States Army, all working together for this worthy cause

That the chairman of this Committee, for the following year at least, be some competent member of this ASSOCIATION who resides sufficiently near the National Capital so that he may readily confer with the officials through whom our work can best be forwarded

No 18 Committee on Press Relations

Resolved that a vote of thanks be extended to the chairman of the Press Relations Committee and his co workers for the efficient work in giving to the press the publicity of the annual meeting held in Washington during this week

No 19 Resolution of Thanks to Governmental Agencies

Resolved, that the ASSOCIATION hereby express its appreciation for the interest and helpful support given by the Commission of Fine Arts, the National Capitol Park and Planning Commission, the Commissioners of the District of Columbia, by other Governmental agencies, and by members of Congress in connection with the location and completion of the American Institute of Pharmacy

No 20 Resolution of Thanks to Architects, Builders, Etc

Resolved that the ASSOCIATION hereby express its appreciation to John Russell Pope Architect, to A F Brinckerhoff, Landscape Architect, to the George A Fuller Company, Builders and to all who have cooperated with them in designing, planning, erecting and furnishing the American Institute of Pharmacy and in landscaping and planting the grounds

No 21 Resolution of Thanks to Hosts

Resolved, that the A PH A extend its sincere thanks to the District of Columbia Pharmaceutical Association to Local Secretary Frank Delgado Chairman Paul Pearson, Mrs Moskey, chairman of the Women's Committee, W P Herbst chairman of the Entertainment Committee and other committee chairmen, the Greater National Capital Committee of the Washington Board of Trade, and the pharmacists of Washington for their hospitality

AN ENGROSSED PARCHMENT FROM THE BRITISH PHARMACEUTICAL SOCIETY

The British Pharmaceutical Society presented an engrossed parchment conveying congratulations on the occasion of the dedication of the American Institute of Pharmacy The document evidences a spirit of friendship and professional relation which is reciprocated and greatly appreciated by the AMERICAN PHARMACEUTICAL ASSOCIATION President F Gladstone Hines, Secretary Hugh N Linstead, Council Member Thomas Marns and Chairman of the British Pharmaceutical Conference Herbert Skinner, attended the Toronto meeting of the A PH A The latter sent a congratulatory cablegram to the Washington convention Copy of the Parchment follows

DEDICATION OF THE AMERICAN INSTITUTE OF PHARMACY

To the AMERICAN PHARMACEUTICAL ASSOCIATION

THE Pharmaceutical Society of Great Britain sends cordial greetings upon the occasion of the dedication of the American Institute of Pharmacy

The Society has known and sympathized with your desire for a headquarters building where your work could proceed without the limitations that have hampered it in the past and it has watched with interest the progress that has been made in recent years toward the fulfilment of this desire in the form of the American Institute of Pharmacy It has been with great pleasure that the Society has learned of the completion of the Institute and of the arrangements for its dedication

THE Society congratulates you heartily upon now possessing a headquarters worthy of your ideals and of the importance of your work and it shares the pride and satisfaction you must feel in a building that combines suitability for its purpose with classic grace and dignity It is a matter of no less gratification to the Society that the Institute should be situated in surroundings of charm and distinction and should enjoy the amenities and prestige derived therefrom The existence of a central institution focusing the pharmaceutical life of the country, acting as a unifying and coordinating influence and providing facilities for the advancement of pharmaceutical knowledge, education and cooperation should prove of great value to pharmacy in the United States of America, the Society sincerely trusts that your services in establishing such an institution will receive due recognition and that you will enjoy a future of increasing progress and prosperity

John Keall, *President,*
E Saville Peck, *Vice-President,*
Hugh N Linstead, *Secretary*

April 24, 1934

PRESIDENT ROOSEVELT'S DEDICATION MESSAGE

THE WHITE HOUSE
WASHINGTON

April 26, 1934

It is with real pleasure that I extend my congratulations and my best wishes to the American Pharmaceutical Association, and to the profession of pharmacy, on this occasion the dedication of this beautiful structure appropriately located here in the Nation's capital as the headquarters of your Association is an important milestone in its history.

I regret that the press of Executive duties has made it impossible for me to greet you here personally, but through this message I express my appreciation of the great work which you have accomplished in the past in contributing to improved standards, not only in products but in professional education and in professional integrity, and in putting American pharmacy in the forefront of the world.

I am proud of the reputation which American drug and biological products, used in the prevention and treatment of disease, enjoy throughout the world and am fully conscious of their importance in our commerce, both national and international. You have cooperated with the medical profession in joint endeavor to prevent and cure illness, lessen suffering, and restore to usefulness and happiness the afflicted of all lands, and you must feel a justifiable pride in making such a contribution to human welfare.

Franklin D. Roosevelt

DEDICATION OF THE AMERICAN INSTITUTE OF PHARMACY

THE DEDICATION

A beautiful day welcomed an assemblage of one thousand or more of invited guests and members of the AMERICAN PHARMACEUTICAL ASSOCIATION at the dedication exercises, held at its home—the American Institute of Pharmacy—on Wednesday, May 9th It was regretted that the President could not attend, but he sent a congratulatory message, which is made the preface of this report

INTRODUCTORY ADDRESS

BY SAMUEL L HILTON, CHAIRMAN

Fellow Members, Honored Guests, Ladies and Gentlemen

As Chairman of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION, I deem it a privilege as well as a pleasure to welcome you to the dedication exercises this morning

It has been a long cherished ambition for us to erect or found or establish a permanent headquarters where all of the activities of the ASSOCIATION could be concentrated and conducted, and where its valuable collection of historical material illustrating the development of pharmacy in this country could be exhibited

The ASSOCIATION has also looked forward to the establishment of a reference library of pharmacy and of a research institute for the improvement of standards for materials used in the prevention and treatment of disease

We are here assembled this morning to dedicate this beautiful and impressive building, designed by Mr John Russell Pope, the well-known architect, approved by the Fine Arts Commission and which will stand as a monument to American Pharmacy and as a consummation of the hopes of all of those interested in our profession

We had hoped to have with us this morning the President of the United States, the activities of Congress now in session, the conditions now existing and the demands on the President's time necessitated his declining, he has, however, sent us a message, this message will be presented by Dr George W McCoy, Director of the National Institute of Health

I am gratified and much pleased to present Dr George W McCoy

In introducing Dr George W McCoy, director of the National Institute of Health Chairman Samuel L Hilton stated that the activities of Congress and the demands on the President's time necessitated his declining the invitation to be present on this occasion, however he sent a message to be presented by Dr McCoy Chairman Hilton remarked that many in the audience knew Dr McCoy, and it was his pleasure and privilege to present him

Dr McCoy's prefatory remarks were addressed "Mr Chairman, Distinguished Guests, Members of the AMERICAN PHARMACEUTICAL ASSOCIATION—I present the following message from the President of the United States "

He then read the message which appears on the preceding page Chairman Hilton thanked Dr McCoy and the audience stood

The chairman introduced as the next speaker Robert L Swain, president of the AMERICAN PHARMACEUTICAL ASSOCIATION

THE AMERICAN INSTITUTE OF PHARMACY DEDICATION ADDRESS

BY ROBERT L SWAIN

"All below is strength, and all above is grace"—Dryden

A contemporary wrote that "Mr Jefferson is the first American who has consulted the fine arts to know how he should shelter himself from the weather" It is most gratifying to note that the AMERICAN PHARMACEUTICAL ASSOCIATION, more than a century and a half later, resorted to the same source in planning and building this home And the arts have given lavishly that the home might be a perfect thing Elegance, charm, grace, all of these have conspired to create some thing of surpassing loveliness To gaze upon this building is to look into the very countenance of art itself A strange feeling of exaltation and humility comes over us as we speak of it as home

And so we assemble here this morning to dedicate this, the American Institute of Pharmacy, as the home of the AMERICAN PHARMACEUTICAL ASSOCIATION It is indeed a most happy occasion The whole thing seems so supremely as it should be For more than eighty-two years, the ASSOCIATION has been in existence, but for all of this period she has been living with members of the family During all of these years, she has been looked after by loyal sons, who have taken enough of their busy lives to see to it that she was sheltered properly, and cared for as her interests and activities demanded First, she made her home with a famous son in Philadelphia in 1852 In 1853, she moved to Cincinnati, and back to Philadelphia in 1858, and on to New York in 1859 In 1862, she returned to Philadelphia, but went back to New York in 1863 Returning to Philadelphia two years later, she remained there until 1894 In that year, she came to Baltimore for an extended visit of fifteen years For three years, she graced the city of Scio, Ohio, and from there journeyed to Chicago, where she remained until 1925 From 1925 to 1934, she again favored Baltimore On the first day of this year, she moved over to Washing ton, and proudly, and it must be admitted a bit belatedly, came in as mistress of her own home As loyal members of the family, we claim our kinship with a feeling of pride We seem to sense that there is something fine in belonging to her house hold As we shower her with congratulations, we confess to a feeling of superiority ourselves as we note that she has acquired a home in surroundings heretofore re served for the immortals

What a matchless scene! The setting of this building alone is sufficient to stir us to the depths of our very souls It is majestic in the fullness of its meaning The ages seem to converge to this very point The hopes, the struggles, the deep yearnings of countless centuries seem to press close to us as we assemble here Here we stand very near to the nation's heart Here we seem to be a part of her proud traditions Here her great teachings seem to take on new life, and to shine with the splendor of the sun

The Capitol of the United States, sitting in quiet majesty at the other end of the Avenue, serves to emphasize the full significance of this undertaking The

banner, which so proudly floats above it, has always been an emblem of promise to the peoples of the world From the earliest days, this country has been devoted to principles of justice and right Her institutions have been expressive of the hopes of a free people, and dedicated to a betterment of all human relations Wars of aggression or oppression do not blot her history Rather she has shed her blood lavishly that the world might enjoy liberty and security May she become the example of all lands "Let us have peace"

We are almost within the shadow of the Washington Monument, this monument of clear, sharp outlines, symbolic of the righteousness of his character, and the symmetry of his life His life rose to such supreme heights that it has been said "the test of progress of mankind will be in the appreciation of the character of Washington" As we gaze upon his classic obelisk, we almost catch the words of Lincoln as he pours out his heart to the only American greater than himself "To add brightness to the sun, or glory to the name of Washington is alike impossible Let none attempt it In solemn awe pronounce the name, and in its naked, deathless splendor, leave it shining on"

In front of us looms the Lincoln Memorial I never stand before this edifice, but I recall the devout lines from Milton "Beauty is God's handwriting—a wayside sacrament" This memorial is a sacrament It stands a tribute to one whose great heart beat for humanity, and whose blood was poured out upon the altar of national unity To him, perhaps as to no other, the world turns in its hours of distress and pain It brings its tears to his very feet It looks into his great eyes for compassion and understanding It was he whose life embraced all life, and whose death teaches how impossible it is for eternal truth to die It is beyond the power of the human mind to think of Lincoln as dead His life, his principles, his great soul are as enduring as the stars He belongs to the ages and to us As we tune our minds to his this morning, we sense the full, deep rhythm of his heart as he pours out his soul to an anguished people "It is rather for us to be here dedicated to the great task remaining before us, that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion, that we here highly resolve that these dead shall not have died in vain, and this nation, under God, shall have a new birth of freedom, and that government of the people, by the people, and for the people shall not perish from the earth"

But a short distance away, over the Arlington Memorial Bridge, lie the nation's dead There, enshrined forever, are those whose lives were devoted to the principle that this country should be a covenant with ages yet unborn, those whose death inspires us to keep the faith, to keep unspotted and unstained the banner for which they died, and under which we live and move As we begin to understand all that our history means, all that it teaches and confounds, all that it builds up and destroys, we become more able to chart the real from the unreal, and to march in tune with the nation's faith and destiny

This building, so aptly named the American Institute of Pharmacy, seems to have been conceived for erection on this very spot Its design is the portrayal of an artist's soul It had its inspiration in a lofty sentiment It is a beautiful dream translated into matchless marble Some great mind has said that architecture is frozen music Certainly it can be nothing less No one can gaze upon

these classic walls without thinking great thoughts, dreaming great dreams, and daring to do great deeds

I have seen this building rise stone by stone I was here when the first spade was pushed into the ground I have watched the patient labor with which this building became an actual thing The process has been a bit mystifying to me I can see how the architect, in the rarified atmosphere of his own mind, might dream this dream I can see it take form and grace in the deep recesses of his own soul It is here that the artist lives, it is from such endless things he draws his inspiration I confess frankly, however, that the process by which the dream emerges in deathless stone remains a mystery It is nothing short of making reality out of unreality, and of translating infinity into the finite It is because of the subtlety of the process that I have a profound respect for the man who deals with the material side He, too, must see poetry in brick and stone He, too, must possess the mystic touch that transmutes the baser metals into gold

To me this building becomes a symbol, a symbol of a profession devoted to the eradication of disease, and to a betterment of the conditions under which we live It symbolizes the countless ages through which pharmacy has trudged side by side with man as he pulled himself along the highways of the past It symbolizes the tenets of professional doctrines which have demanded higher and ever higher stand ards for drugs and medicines It symbolizes the quiet faith of the research worker as he crystallizes his imagination and creative skill into new products for the alleviation of pain It symbolizes the determination and patience of the pharmaceutical educator as he pours out his life in training others for their great responsibilities It symbolizes the obligation of pharmacy as it bends to the task of conserving and improving the public health It is a symbol that pharmacy will be as true to the future as it has been to the past

Aside from the beauty of its surrounding and the quiet grace of its design, the American Institute of Pharmacy will be devoted to the development of phar macy, and for a betterment of its professional service It will become a veritable workshop for the advancement of those sciences upon which the public health so largely depends It will house promptly, so I fervently hope, all those agencies concerned with professional phases of pharmaceutical work I hope that pharma ceutical education will make its headquarters here, and that the legal side of pharmacy, as represented by the examining boards, will also seek a place here

I look forward to the time when these walls will embrace a well-rounded, efficient and forward-looking pharmaceutical program There are many studies of the most far-reaching importance which need to be organized, systematized and carried out without undue delay There are research studies of great bearing upon the United States Pharmacopœia and the National Formulary, as national legal standards for drugs and medicines, which should be begun The drug industry and the Government should look here for the scientific work upon which drug standards rest, and for the technical directions under which they are to be achieved Un folding of the picture indicates just what a magnificent destiny confronts us

Unfolding of this picture also discloses our individual responsibility It challenges us to give our best thoughts and talents to our profession It is a crying demand to measure up to our responsibilities to ourselves and to be diligent in meeting our obligations to the public health In a large measure, this mag

nificent undertaking will fail if it does not kindle an inextinguishable fire in our professional consciousness Not only must this building rightfully portray our calling, it is necessary that we, too, measure up to the same standard and assume, in no small part, the same task

As we dedicate this building, we should, in an equally large measure, dedicate ourselves There is a vast work to be done within our own ranks There are those who have wandered off into strange lands, and are bowing down to strange gods There are those who would tear down rather than build up There are those who scoff at professional ideals, and who deny the existence of high professional principles There are those who would destroy the intrinsic things for which pharmacy stands

We need a greater devotion to fundamental things We need to see beyond the purely materialistic point of view We need to grasp the bigness of the task which gives us a real place in the fight against disease We really need to think great thoughts We need to feel just what one great soul must have felt when he said that "every calling is great that is greatly pursued "

As we become aware of the vastness of this project, as our hearts begin to beat in harmony with its great ideals, as we catch a glimpse of the immensity of the principles for which it stands, let us, too, become dedicated to the great tasks remaining before us Let us resolve that this edifice shall really be our image! Let us be determined to be worthy of it May we never forget that the American Institute of Pharmacy is dedicated to those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy

Chairman Hilton thanked President Swain

In introducing the next speaker Chairman Hilton referred to the outstanding work in Government development and the beautifying of Constitution Avenue and other sections of Washington for which Mr Charles Moore is the directing head and which is making the City the most beautiful in the world He also referred to him as a friend of this organization and as chairman of the Fine Arts Commission

RELATION OF THE INSTITUTE TO THE WASHINGTON PLAN

BY CHARLES MOORE *

The original plan of Washington designed by L'Enfant in cooperation with President Washington was reaffirmed and extended by the Senate Park Commission of 1901 That plan maps main elements of the scheme of development you now see in progress The Lincoln Memorial, one of the chief features of the large plan, has now taken its place among the chief monuments of the world The building, like the man, belongs to the ages On its inner walls are carved Lincoln's Gettysburg Address and his Second Inaugural, heart-born thoughts expressed in diction comparable with Pericles's immortal oration over the Greeks who fell at Thermopylæ

Into the sphere of architectural influence exercised by the Lincoln Memorial this Pharmaceutical building comes By virtue of patient and sympathetic co-

* Chairman National Commission of Fine Arts

operation between your officers and architect and the members of the National Commission of Fine Arts, this building has become a vital portion of the frame to the Lincoln Memorial picture

How vital is this relationship was very recently told me by your reticent architect, John Russell Pope "When plans were making to mark Abraham Lincoln's birthplace at Hodgenville, Kentucky, the program of competition called for one building to embody in its architecture as well as its contents the spirit of Lincoln I submitted a design based on this representative idea When a totally different scheme was adopted, I put away my drawing sadly, as every artist does when he finds one of his conceptions fails of realization Years passed This Pharmaceutical Building came to me I made many sketches One day the design for the Lincoln Birthplace came to mind I got it out of its repose and found that to my mind essentially it solved the double problem of a building with a purpose and yet in spirit akin to the Monument in whose company it stands "

Such in brief is the story of the inception and conception of this Pharmacy Building Unconsciously the spirit of the design—its elegant simplicity, the richness of its landscape setting, its thorough appropriateness instantly impress artist and layman alike So, my friends of long struggles now happily ended, let me congratulate you on providing a fitting home for the life-saving service your profession performs, and at the same time paying due tribute to the Savior of our Country May you persevere in well doing both in spirit and in architecture

Chairman Hilton referred to the building of the American Institute of Pharmacy as the design of an artist who grasped the ideals of the officers of the AMERICAN PHARMACEUTICAL ASSOCIATION Mr Pope was called to Europe, the chairman introduced Mr Daniel Higgins, a partner of the former

REMARKS BY DANIEL HIGGINS (in part)

Mr Pope would be delighted to be here and meet the members of the ASSOCIATION, the other partner, Mr Eggers,[1] is here and delighted to meet those who have inspired this architecture He believed that Drs H A B Dunning and E F Kelly were more responsible for this achievement than the architects The symbolizing of the ideal in one building is extraordinary and this inspiration led the architects to do the very best that was in them When Mr Pope first heard of this great ideal he gave it much attention "to bring out something " It gave us a great opportunity and the hope is that we will again have a pleasant association He turned over the key to Chairman Dunning with a great deal of appreciation for all of his efforts, for without his work and that of Secretary Kelly, this building would not have been a success

Chairman Hilton thanked Mr Higgins and introduced Theodore Weicker, who came forward at once with a contribution when the project was started

REMARKS BY THEODORE WEICKER

Ladies and Gentlemen

Not far from the spot upon which we are standing rises one of the most beautiful edifices that we as a people have ever built In the beauty and the simplicity of its

[1] It was necessary for Mr Eggers to return to New York

architecture, it compares with those temples which the Athenians of old set upon the height of the Acropolis With all the massive beauty of its gleaming marble, that building is yet a symbol—symbol of a man who lived to preserve the highest ideals of this nation In that temple, as in the hearts of his countrymen, is enshrined forever the name of Abraham Lincoln

We are gathered here to-day to dedicate another building—a building which is also a symbol In its classic simplicity, this building represents the high ideals that should forever inspire and guide American Pharmacy

From the earliest beginnings to the present day, the profession of pharmacy, guided by such ideals and dedicated to the service of the people's health, has grown steadily in importance Steadily throughout the world it has developed into a body of true organized science, as an aid to medicine

But American Pharmacy, especially in the last two decades, has been beset by a growing commercial spirit, a spirit generated in part by economic pressure and in part through the failure of our governmental agencies to comprehend the character and the very nature of pharmacy The hand of greed has striven to destroy the ideals of this profession It has put in the path of those who would practice it in this country new and greater difficulties and uncertainties Its pressure has made it almost an impossibility at times for a pharmacist to function without making compromises or sacrifices which endanger his very existence

The hand of greed must not be permitted to destroy the ideals for which this profession has always stood —Man lives for something more than bread alone

The noble building which we have come here to dedicate is in itself a challenge to the commercial spirit which has intruded itself into the field of American Pharmacy, and which menaces the purposes of this high calling The prominence of the site this building occupies in the Capital of our country, the pure grace and nobility of its design, the well-considered appointments of its interior are the more important to us all because of the challenge they symbolize

In dedicating this building, then, shall we not also consecrate ourselves anew to the proposition that American Pharmacy shall not be mastered by commercial ambition—that American Pharmacy shall take its rightful place in our civilization as an indispensable aid to the medical profession and as an indispensable force in making a better and healthier America?

To these ends and in this spirit of consecration we dedicate The American Institute of Pharmacy

Dr R B J Stanbury, secretary of the Canadian Pharmaceutical Association, was introduced

REMARKS BY R B J STANBURY

I bring to you the cordial greetings of the pharmacists of Canada on this epoch-making occasion—the dedication of this beautiful temple to American Pharmacy

This building will be the center from which pharmaceutical influence will radiate, and here will be the place to which pharmaceutical forces will converge This structure is not entirely the product of those immediately associated with its construction, although their efforts merit the highest praise It is the cope-stone of the achievement of those who in past years have dug deep the foundations and who

tirelessly and persistently laid stone upon stone and tier upon tier till to day this splendid superstructure stands, the admiration of all

On looking over our drug stores to-day I consider that many of our troubles are of our own making If good old Galen, the Father of Pharmacy, could look over the parapets of heaven or gaze upon us from his "open view" celestial dispensary, I am sure he would be vexed and humiliated to see the lunch counter, the cigar stand, the magazine rack and various kitchen utensils occupying the principal place in the drug store, while those tinctures and pharmaceutical preparations, which he toiled so laboriously to produce, are hidden away in some obscure corner

I think, Sir, we need to clear away the excrement which has accumulated in the drug store, during the past generation more particularly, which is making it ob noxious in the nostrils of physicians and a by-word in the press, and by the public We might not need sixty thousand so called drug stores in this country, but the thirty thousand survivors doing the real work of pharmacy, becoming a real hand maid and complement of the physician, would command the respect and honor of both physician and public

I trust, Sir, under the ægis and inspiration of this Building which is being dedicated to-day, and of the men who are giving leadership, there may be a renaissance of pharmacy in this country, and a greater emphasis placed on the professional side of our vocation

The chairman thanked Secretary Stanbury and introduced William Pfeil a boyhood friend who was born on the site now occupied by the American Institute of Pharmacy and still resides within a block of the building He referred to the great interest of Dr Hilton who had enlisted him in securing part of this property He gave a brief account of the development of this section

Chairman Hilton spoke of the dynamic power and executive ability of Chairman H A B Dunning which was largely responsible for the American Institute of Pharmacy His heart and soul are in the work Chairman Hilton then introduced Dr Dunning who introduced his remarks by saying that his part was the practical side of the work and he wished to impress that he was seeking practical reactions through his address

REMARKS BY H A B DUNNING

The AMERICAN PHARMACEUTICAL ASSOCIATION was established 82 years ago, with the object of advancing the science and art of pharmacy and of improving the conditions of pharmaceutical practice

Throughout all the years that have passed since its organization, the ASSOCIATION has fought for and maintained the ethics, ideals and professional principles which represent the true value of pharmacy

Its membership has embraced the best of everything in pharmacy—educationally, scientifically and altruistically—including pharmacists engaged in all branches of the profession and industry, and scientists and research workers interested in the advancement of pharmacy It has emphasized the obligation of the profession to the public which it serves and has striven to throw every possible public protection around the preparation, standardization, distribution and dispensing of drugs, medicines and medical supplies

The ASSOCIATION, from the beginning, has taken leadership in all those activities which represent the improvement and progress of pharmacy as a public health service These activities have included pharmaceutical education and training,

the examination and licensing of pharmacists by the states, legislation regulating the practice of pharmacy and limiting it to those so licensed, legislation controlling the identity, purity and strength of drugs, the development of the literature of pharmacy and the stimulation of research for the discovery of new medicinal agents and the improvement of those in use It has worked to organize pharmacists for their own advancement and for the better service and protection of the people

Its members have been especially active in promoting and improving drug standards and in the enactment of laws governing the proper distribution of drug products They have taken an increasingly important part in the decennial revisions of the United States Pharmacopœia The ASSOCIATION established, revises and owns the National Formulary These two works recognize and provide standards for the drugs and preparations generally employed by all branches of the medical profession in the treatment and prevention of disease They were voluntarily observed until their adoption by the Pure Food and Drugs Act, which gave them a legal status

The ASSOCIATION has furnished models for most of the laws, state and national, which affect pharmacy, and is interested in their constant improvement to meet the advancing requirements of the time

It is not my purpose to review or even to summarize the great work carried on by the ASSOCIATION in the past eighty years It is rather my idea to establish a background for the institution which we are here to dedicate This architecturally perfect, wonderfully located, impressive building is not intended as an expression of pride by the pharmacists of this or other countries—it is to be a service institution to all pharmacy and to all people It represents an effort to concentrate and equip these agencies interested in the advancement of our profession and the improvement of pharmaceutical service

The impressive location and handsome exterior of the building will attract the attention of many people who know but little of the value and service of pharmacy and the institution, which will be open to the public, will provide the opportunity to obtain first-hand information

On either side of the beautiful rotunda, space is provided for a reference library and an historical museum, both of which are intended to illustrate the development of the art and science of pharmacy

As the building has been occupied only since January, the library and museum are but partly arranged There is a vast amount of valuable material available and these divisions of the institution will grow in importance as time goes on

In the rear of the building is a series of offices in which it is intended to accommodate the general activities of the ASSOCIATION and of those related bodies which meet the requirements of Public Resolution No 18, adopted by Congress, limiting the use of the building to those organizations and institutions serving American Pharmacy on a non-profit basis Here, in time, will be housed all of those interests which work disinterestedly and cooperatively for the preservation and advancement of professional pharmacy and for the betterment of its public health service

The facilities offered by this building will be immediately available to the following educational and professional pharmaceutical bodies, and it is hoped that they will make use of them—American Association of Colleges of Pharmacy, Ameri-

can Association of Boards of Pharmacy, Conference of Law Enforcement Officials, National Formulary Revision Committee, United States Pharmacopœial Revision Committee—and a large room is provided for quarterly or semi-annual meetings of the Conference of Pharmaceutical Association Secretaries Here, all together, will be housed all of those interests, working disinterestedly for the advancement, progress and preservation of professional pharmacy, with the object, through co-operation and earnest endeavor, of correlating the work and efforts which must result in the improvement of pharmaceutical practice and the betterment of the public health service

Immediately in the rear of this building, within a short time, there will begin the erection of another building, of much the same size, or perhaps a little larger, of a fitting architectural design, by the same architect, a research laboratory, fully equipped, representing a gift from a graduate pharmacist, now a manufacturer of pharmaceutical products used throughout the world

In the beginning, the work in this research laboratory will be devoted, almost entirely, to the standardization of the drugs and chemicals and preparations recognized in the United States Pharmacopœia and the National Formulary It is not intended that the work in this research laboratory should, in any sense, conflict with or take the place of, the tremendous amount of voluntary investigative work which is being done by hundreds of pharmacists and other scientists throughout the United States, either representing the efforts of the individual pharmacists, or the special investigations being made in the research departments of large manufacturing drug houses Most of this work will be self-supporting and will be paid for out of the funds accumulated out of the sale of the National Formulary, or with funds allocated by the United States Pharmacopœial Committee, in payment for special investigative work

It is hoped and expected that, as time goes on and new funds are available, other special investigations, in cooperation with our numerous pharmaceutical research laboratories, will develop

I have not said anything in this address about how the building came to be thought of and happens to be here It is much too long a story to tell, under the present circumstances, but I can give you some of the high lights

The idea was advanced from time to time during the past twenty-five or thirty years, by different leaders of the ASSOCIATION and, in time, a committee was formed with the purpose of accumulating funds, but no very great progress was made until 1923 At that time a new committee took over the work and, within a year or two, raised approximately half a million dollars, through the contributions of the retail, wholesale and manufacturing pharmacists in this country and from other countries Over 16,000 donations were made, a few exceeded $50,000 and a number were in excess of $10,000 It is not now appropriate to tell you of the trials and tribulations suffered by your committee in obtaining the site on which this building stands and keeping it after we got it, but I must tell you that, without the cooperation of the Fine Arts Commission and the Parks and Planning Commission of this City, it is doubtful that we would have been able to accomplish our purposes

In conclusion, I wish to impress upon all of those who have contributed time, labor, interest and money to this project that this building is not a white elephant on the hands of the AMERICAN PHARMACEUTICAL ASSOCIATION The building is

practically paid for, including land, equipment, furnishings, and its cost is nothing comparable to its value

The operations of the building, as they stand now, are almost self-sustaining, but not quite I am confident that those of you who are interested in pharmacy, who are here to day or will come in the future, will be quite willing to do their part, not only in clearing away the very small financial liability, but will provide an additional sum for the maintenance of the work which is planned to be done here and for conservative and necessary expansion

I am sure that all of you realize the importance of this project to pharmacy, not only from a professional and altruistic viewpoint, but from a material standpoint The prestige of pharmacy must be maintained, if it is to continue to enjoy the special privileges and advantages which the public accords it as a profession I believe that all of us realize that the AMERICAN PHARMACEUTICAL ASSOCIATION represents the greatest assurance for the security of these privileges and that this fine new building gives it a better opportunity than ever before to fulfil its mission

After concluding his address Chairman Dunning referred to a visit to Mr Pope's home to discuss plans for the building, he said

"He told me much the same thing that Mr Higgins has told you, that he felt that this building, the design for this building, represented the most artistic, and the most important effort of his life from an architectural viewpoint, and that it was close to his heart, and that he would be most happy to see his ideas materialize

"Mr Higgins took the opportunity to turn over to me this small key (holding up the key) to this comparatively large building The relationship of this key in size to the building is just about the proper proportion in my mind, and in the minds of others, to its value to pharmacy and to our people

"I am passing this key to the man who will make the most use of it, the most practical use of it, and whose heart and soul are tied up in the work that will be carried on in this building, whose heart and soul are tied up and have been tied up in Pharmacy and its progress and advancement for many years, and if he doesn't work himself to death, probably he will spend many more valuable years, valuable to us and to him, in serving pharmacy in the cause of public health "

Chairman Hilton said that no exercises of the AMERICAN PHARMACEUTICAL ASSOCIATION would be complete without a message from Secretary Kelly He introduced him as one who could always be depended upon and has never been found wanting

REMARKS OF SECRETARY KELLY

Ladies and Gentlemen, it is a great pleasure for me to accept, on behalf of the ASSOCIATION, this key to our home However, I want you to know that it is only a symbol and that from this time on these doors will never be closed to those who are interested in our work

It has been a very great pleasure to me to work with Dr Dunning, Dr Beal and others who have contributed so materially to our efforts to erect this building and I join in Dr Dunning's expression of appreciation to those agencies of our Government who have been so helpful to us in carrying our plans to completion

We also assure you, as he has, that this is intended to be a service institution We hope you will never hesitate in letting us know how to make it more useful to

the health and well-being of the people of this country We desire to make the most helpful contribution possible to the standardization and improvement by scientific processes of those materials that are used in the prevention and the treatment of disease

It is my very pleasant duty to thank those of you who have come here to help us celebrate this great event in the history of our organization We hope to see you here frequently and, particularly, wish to express our appreciation to those who are here representing other than our profession Our desire is to have the American Institute of Pharmacy represent a closer unity between the organizations that have to do with public health I thank you very much

Chairman Hilton stated that when the building was under way for the laying of the corner stone it was decided to have the ceremonies connected therewith at the time of the dedication of the building The corner stone was put in place and a block of marble placed over it so that it is possible to remove the corner-stone and place therein the copper box containing the records and this will now be done

He called on former president W Bruce Philip, who would have had the privilege of laying the corner stone if the ceremonies had taken place last year, to ac ompany him for the purpose of placing the copper box in the corner-stone

This was done in due form and Chairman Hilton, on behalf of the AMERICAN PHARMACEUTICAL ASSOCIATION, thanked those who were in attendance on this auspicious occasion The musical program for the occasion was rendered by Goldman Band, the program opening with America ' and closing with ' Star Spangled Banner

---

THE ANNUAL BANQUET OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AND THE PRESENTATION OF THE REMINGTON HONOR MEDAL TO SIR HENRY S WELLCOME

More than five hundred members, ladies and guests were seated at the banquet tables on Tuesday evening, May 8th The occasion was the annual dinner of the AMERICAN PHARMACEUTICAL ASSOCIATION and of affiliated organizations, and the presentation of the Remington Honor Medal to Sir Henry S Wellcome, of London, by the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION The delightful function took place at the Shoreham Hotel, President R L Swain pre siding as toastmaster The presentation ceremonies were preceded by vocal solos by Mr Carson P Frailey, secretary of the American Drug Manufacturers' Asso ciation and president of the National Drug Trade Conference, and vocal solos by Mr S O Christie, also a pharmacist The Board of Commissioners of the District of Columbia was to have been represented by Hon M C Hazen, its chairman, who was prevented by important business and he requested Samuel L Hilton to speak for him, who did so briefly in the following words

REMARKS BY S L HILTON

Mr Toastmaster, Ladies and Gentlemen

"Just a short while ago I received a telephone message from Commissioner Hazen that he would not be able to be present, and as a result I am called upon to pinch hit for him Do not expect a home run, that is impossible, if I make a base hit I will feel satisfied

"On behalf of the Commissioners of the District of Columbia I extend you a most cordial greeting and hearty welcome to the Capital City

"On such occasions as this I know it is customary to present you with the key of the city, lack of time for one thing and the fact that we have no key to the city prevent such a formality The Capital City is your city—you require no key to enjoy its hospitality and you are always welcome

"In extending the greetings of the Commissioners of the District of Columbia, they wish you every pleasure the city affords, and a most successful convention They are much pleased that your magnificent new building, occupying the prominent position it does, facing the Lincoln Memorial and the Arlington Memorial Bridge and in which they have been so deeply interested, will be dedicated on this occasion

"We extend you a hearty welcome on all occasions and trust you will visit the Capital City again in the near future and that you will carry home with you the most pleasant recollections of your visit

"I thank you "

Augustus C Taylor speaking as president of the District of Columbia Pharmaceutical Association said

Mr Toastmaster, Sir Henry Wellcome, Honored Guests and Friends

I thank you for this opportunity to extend greetings from the officers and members of the District of Columbia Pharmaceutical Association We consider it a great privilege to have this chance to act as host to the oldest and most honored pharmaceutical association of our country We are likewise proud of the same privilege to act as host to those allied associations that are holding their conventions or conferences at the same time

We welcome you to your capital—Washington the City Beautiful—the city that after the dedication to-morrow of that beautiful building, the American Institute of Pharmacy, will in reality become the home of Pharmacy in America

The presentation of the Remington Medal and the dedicatory exercises to-morrow will long be remembered by the members of our ASSOCIATION and we will always be proud of the part taken by the District of Columbia Pharmaceutical Association toward making these events a success

The District of Columbia Pharmaceutical Association is almost as old as its beloved parent association but with an age of 76 years it is still going strong Founded in 1858, records show continued activities, excepting the period of the Civil War, to the present time Looking back over this long period we find this association always in the front rank striving to improve the standing of Pharmacy At all times we find members of our Association working in some way or another to protect the welfare of the members of our profession

Many of our members have been honored with high offices in the AMERICAN PHARMACEUTICAL ASSOCIATION or allied associations Five have been president of the A Ph A John S Kidwell 1858–1859, W S Thompson 1893–1894, Oscar Oldberg 1908–1909, S L Hilton 1921–1922, W B Philip, a Californian when chosen, but a member of our Association during his term of office—1932–1933 W H Bradbury served as president of the Federal Wholesale Druggists' Association, F T Stone of the N A R D , and A C Taylor of the N A B P Many of

our members hold the chairmanship on important committees in all the National associations

As your host we wish you to have a good time and a successful convention and it is our hope that you will want to come again This is not the first time the A PH A met in Washington and we trust it will not be the last

This city is a great place for conventions A fortnight ago we had a grand gathering of medical men, last week a large group of nurses from all over the country graced our city, this week we have this wonderful gathering of pharmacists, and we will be followed in the near future by the undertakers

Thank you

After the conclusion of the dinner, which was enjoyed by the participants of the feast, the toastmaster presided over the presentation ceremonies for New York Branch, A PH A

Sir Henry S Wellcome, Remington Medalist

Inscription on Remington Medal

Joseph P Remington—Face of Medal

REMARKS OF ROBERT L SWAIN

We now come to the impressive feature of the evening—awarding the Remington Honor Medal This medal, given in memory of that great pharmaceutical teacher and leader, Professor Joseph P Remington, was established by the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION The award has heretofore been presented at some function of that body This year, however, in recognition of the unusually distinguished recipient and the fact that he was in attendance at this convention, the New York Branch has done the ASSOCIATION the courtesy of making the award at this meeting

Dr Charles W Ballard, president of the New York Branch, would have made the award, but he is compelled to be absent because of the serious illness of his father Dr Hugo H Schaefer, in whose mind the Remington Medal was first conceived, was to have acted for Dr Ballard, but, at the last moment, Dr Schaefer found it would not be possible for him to reach Washington until to-morrow afternoon And so, I shall act for the New York Branch in the remainder of the evening program

The Remington Honor Medal for 1934 has been awarded to Sir Henry S Wellcome, truly one of the most distinguished citizens of the world This medal is awarded annually to that pharmacist making the most valuable contribution to pharmacy either in the year preceding or in a collective sense over a period of years Sir Henry meets every qualification which could be set up, and he richly merits the

honor He is not a stranger to distinction Recently he was knighted by his King in recognition of his great contribution to humanity He is a pharmacist of international renown A British subject, his interests have embraced the world, and his benefactions have brought life and happiness to the people of every land He loves science largely for herself alone, and his research projects have added much to scientific knowledge and to an understanding of great scientific truths He loves science, too, because of her contributions to medicine, chemistry, pharmacy and sanitation, all of which so closely affect human beings and the conditions under which they live

Sir Henry has given lavishly of his time, lavishly of his fortune and lavishly of his heart that medical science might develop and expand He has established great research laboratories for the study of health and medical problems His objective has been to make life a richer, fuller and deeper thing

He long since ceased to belong to one country He has become as universal as the science to which he is so greatly devoted The bigness of his heart, the embraciveness of his mind, the universality of his humanity have made him a citizen of the world and the benefactor of peoples everywhere In honoring Sir Henry S Wellcome, pharmacy in a much truer sense honors itself It is a recognition of the great debt we owe him, and a recognition, too, of his far-flung philanthropies in the field of public health As he has made life more abundant for others, so has he created in us a higher ideal and a sounder conception of the real aims and purposes of our profession

After the conclusion of these remarks the chairman introduced Robert P Fischelis, as a former president of New York Branch, A Ph A

Mr Leander McCormick-Goodhart, representing the Ambassador of Great Britain, was then introduced, he spoke as follows

Mr Chairman, Sir Henry Wellcome, Members of the American Pharmaceutical Association

It is the old, old story When I had the pleasure of talking over the telephone this morning to Dr Kelly, your secretary, there was a reciprocal understanding that if I attended your dinner this evening I would not be called upon to address you The result is that here I am standing on my feet As representing the British Ambassador, my message is a brief but very sincere one Sir Ronald Lindsay asked me to extend to you his very cordial greetings and his profound regrets that he was unable to be with you this evening owing to an unavoidable engagement elsewhere Sir Ronald would have been glad to be here, not only on account of the pleasure which it would have given him to see his distinguished compatriot honored by the award of the Remington Medal, but also for other reasons He would have wished to be here in order to congratulate you on the opening to-morrow of your superb new building which occupies one of the finest sites of the city nearly opposite to the noble Monument of one of your greatest Presidents He would also have appreciated being at a dinner held by what he understands to be one of the oldest scientific associations in the United States And, lastly, he would have been especially glad to be here as, since I am informed by the chairman, the Pharmaceutical Association is the one organization which is not permitted to make mistakes We

diplomats often make mistakes and it is evident that we have a great deal to learn from yourselves

If I may be permitted to make a personal reference, I have been interested in pharmacology for the last 39 years It began this way The chairman has referred to my being an adopted Marylander, but 39 years ago I was a small boy playing in a sandlot in a little village in the mid-West—Chicago I got a pain The doctor came to see me It turned out to be the appendix He was a Homeopath and he gave me some delicious little pills which cured the trouble It was a great opportunity to study the physiology of the effect of drugs on the human system! Well, for 38 years those little pills did their trick, but last year they failed me and I was obliged to have it out

I wonder whether any of you have ever thought of a connection between pharmacology and poetry Perhaps some of the charming ladies here present have thought of it in this light In 1823 one of the most distinguished of British poets, Lord Byron, was in Florence He went into a drug store and presumably bought himself something But he carried away from the drug store a printed advertisement of one of the preparations sold in there, and he took this advertisement back to his lodgings in Genoa He eventually threw the advertisement into the wastepaper basket but not without having written one of his immortal poems on it consisting of about twenty lines I hold it up here for you to see Unfortunately it is so illegible that I am unable to read it This little incident surely proves the nobility of the art to which you have devoted yourselves!

It has given me a great deal of pleasure to be present with you this evening I thank you very much

The toastmaster introduced Charles Moore chairman of the Commission of Fine Arts, who spoke as follows

Mr Chairman, Sir Henry Wellcome, Members of the Association

From going to and fro in the earth and from walking up and down in it, occasionally one meets great men Such may be divided roughly into those one knows and those who know him I have been asked to speak words of greeting because of a belief that I both know and am known by that great benefactor of the human race, our guest, Sir Henry Wellcome

I met him first about the end of the World War, in the hospitable home of Dr and Mrs Charles W Richardson, in one of the small companies Dr Wellcome insisted upon before accepting an invitation The scene rises before me as a dream The white flowers on the table, the mellow light of the candles falling softly on the dark hair of Dr Wellcome as with bent head he quietly told of his first experience with malaria by a virulent infection from a mosquito at Panama, and of a second equally virulent infection from a similar cause on the upper waters of the Amazon Told also the tragic tale of Gordon's beneficient rule in the Egyptian Sudan, of his assassination by a hired traitor, the massacre of the heroic garrison of Khartoum and the sixteen years of devastation during which every vestage of civilization was wiped out and more than twelve million men, women and children were ruthlessly slaughtered At the time of Lord Kitchener's final victory over the devastating Dervishes a large portion of the population was suffering from tropical fevers, and thousands of Kitchener's own men were stricken by mosquito-borne diseases

Modestly he told us that he was one of the first civilians, after Kitchener's reconquest, to journey to the Upper Nile to study conditions in the Sudan As a result he offered to equip complete tropical research laboratories as adjuncts to Gordon College at Khartoum His camel caravans carried help by land and a floating laboratory bore relief up the many Nile tributaries

In all this welfare work there was a spice of romance, for this region was once the kingdom of the Queen of Sheba, whose visit to King Solomon is so severely reprehended by sex-moralists of to day The capital of her Ethiopian kingdom, Dr Wellcome was then excavating with a force of several thousand Sudanese He had not as yet found her jar of cosmetics

I suppose that Dr Wellcome (as he then was) and I were drawn together by the fact that the two Squibbs, father and son, were my close friends, as was also Frank Ryan of Parke, Davis & Co , and that I had known both Mr Parke and Mr Davis

Incidentally I may note the coincidence that as the Wellcome Medical Museum in London is built on the foundations laid by Burroughs, Wellcome & Co , so the Freer Gallery of Far Eastern Art, here in Washington, each preeminent in its special field, was financed and is maintained largely from the profits of Parke, Davis & Co The restorative qualities of pharmacy reach even into the fine arts Sir Henry's new Research Institution in London would be at home architecturally with the Government buildings now under construction here in Washington

Next, I met our guest at a little dinner given by Mrs Gorgas—Lady Gorgas, by rights—widow of Surgeon General William C Gorgas, whose achievements in sanitation are commemorated in the Gorgas Memorial Institute of Tropical Medicine at Panama That out-post in the strife for health among our southern neighbors owes its very existence to the example of Sir Henry Wellcome and to his testimony before the House of Representatives Committee on Foreign Affairs on January 20, 1928 When others doubted or hesitated, Dr Wellcome had powerfully supported Dr Gorgas in Panama

I was honored by being one of the six or seven guests at a luncheon given by Dr Wellcome to Sir St Clair Thompson, then president of the Royal Medical Society of London—a Scotchman with a rare sense of humor Also I attended the large and brilliant luncheon he gave to his fellow-working archæologist, Professor Reisner

Latterly our meetings have been occasional indeed, but always with the cordiality that knows no intermissions of time or distance While visiting Washington he intrenches himself in his fastness, where he is ever plotting some new scheme for doing good Too often we, his friends, are reminded of Lowell's changeling—"we only know he came and went "

From the inception of the project for building your Pharmacy Building, Sir Henry has been vitally interested in it in its location, its design and its surroundings Possibly it speaks to him of his birth in Wisconsin, of his training in Chicago and Philadelphia, of his early travels on this hemisphere from Alaska to the equator At any rate it shows that his change of skies implies no change of heart So, Sir Henry Wellcome, benefactor of humanity in four continents, we greet you

Secretary R B J Stanbury of the Canadian Pharmaceutical Association was introduced as the next speaker, his remarks follow

Mr President, Members of the American Pharmaceutical Association, Sir Henry Wellcome, Ladies and Distinguished Guests

I bring to you the congratulations and felicitations of the president, officers and members of the Canadian Pharmaceutical Association on this auspicious 82nd Annual Convention of your ASSOCIATION

Here you are assembled in your national capital with its historic environs and its rich traditions, to deliberate on the pharmaceutical problems of this country We, in Canada, look on this parliament of American Pharmacy with more than passing and casual interest, for whatever decisions you arrive at have their reper cussions in our country

Two years ago we had the pleasure of welcoming you to the city of Toronto It was the occasion of the 25th anniversary of the Canadian Pharmaceutical Asso ciation and this reminds me that in 1877 you celebrated your 25th anniversary in the city of Toronto and elected a Canadian, the late William Saunders, as president of the AMERICAN PHARMACEUTICAL ASSOCIATION

This meeting in Toronto in 1932 was a unique and delightful event We had representatives of the three great English-speaking pharmaceutical bodies of the world—England, United States and Canada We were able at close range to get the viewpoint of each other and gain a clearer understanding of the aims and objects of our various associations

That meeting will always live in my memory and I believe will always be cher ished by those who were fortunate enough to be present

I am glad to be here to-night and to have the honor and opportunity of joining with you in greetings to Sir Henry Wellcome He is home on his native heath, re ceiving the warm-hearted and affectionate tribute of those who have watched his development from an apprentice lad in a frontier settlement of Minnesota all through his years of study and research and his intense interest in ethnological and archæological subjects

Sir Henry has been honored by membership in many scientific and medical societies and has had degrees conferred on him by several universities

King George created him a Knight in 1932 This evening you will present him with the Remington Medal, the highest honor the profession of pharmacy in America can bestow, which I believe Sir Henry will consider the crowning glory of his career

Sir Henry—you have conducted research in South America, you have explored the upper regions of the Nile, you have delved into the history of medicine and car ried on research in medicine, but in all your research and exploration, I do not be lieve you have heretofore found the priceless jewel you have discovered at this banquet to-night—the friendship and love of your fellow pharmacists

Up from the day of small beginning
Out to the wide world's utmost ends
There's nothing worth the while of winning
But friendship and the love of friends

I hope you will live, Sir, for many years to enjoy your well-earned honors and to pursue your research in the interests of science, and for the benefit of humanity

Dr Robert P Fischelis a former president, delivered the message of President C W Ballard, of the New York Branch A PH A —it follows

"While in modern times the universality of science transcends both political boundaries and racial differences, it is only in that branch of science dealing with the art of healing that this common accord has prevailed almost unbroken from antiquity Practitioners of medicine in early times regarded service as one of the obligations of their calling and so it remains to-day Empiricism has given way to rationalism in therapeutics, unsubstantiated opinions have been replaced by certainty and accuracy in diagnosis, but service to mankind still remains a motivating factor in medicine and its closely allied calling—pharmacy This service is extremely varied in its scope and the manufacture of suitable remedial agents contributes in no small measure to the armament of the physician in his unceasing war on disease When, as in several instances, the pharmacist in his efforts to perfect medicaments undertakes extensive research projects, either personally or by unstinted support, he strengthens the bonds between medicine and pharmacy and, what is of greater import, he immeasurably increases the service these callings can render mankind

"It is eminently fitting that the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, through the establishment of the Remington Honor Medal should commemorate one who labored long and earnestly for American pharmacy It is for meritorious service in pharmacy and wisely without restriction as to the nature of this service thus recognizing the various activities within the scope of our calling If my recollection is correct, this is the first instance of its award to one other than a citizen of this country In its bestowal upon Sir Henry Wellcome we not only recognize his labors in pharmacy but also establish a precedent which prevails in the award of the Hanbury Medal of the British Pharmaceutical Society I consider myself singularly fortunate in a long association with one who has been so honored by the pharmacists of Britain, and to you, Sir Henry, I bring this letter of felicitation from an American Hanbury Medalist—Dr Rusby

"And now I turn to those who can adequately speak of the widely diverging interests of the Remington Medalist of 1934, Sir Henry Wellcome

"It is a happy coincidence that he, who is senior among the past presidents of the New York Branch in attendance on this occasion, should be a graduate of the Philadelphia College and at a time when Professor Remington was a member of that faculty As president of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, I request Dean Arny to award the Remington Medal to Sir Henry Wellcome "

THE PRESENTATION OF THE MEDAL

Dr H V Arny opened his remarks by expressing regrets over the unavoidable absence of his predecessors as chairman of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION Messrs Diner, Raubenheimer, Diekman and Bigelow, extending their personal greetings and their regrets

He then spoke of the life of the 1934 recipient of the Remington Honor Medal as one of the world tales of American Pharmacy, a story which he delights to recite each year to the pharmacy students at Columbia Henry S Wellcome, son of an American pioneer, a pioneer in his own right, the boy of eight who followed the

covered wagon of his father from Wisconsin to Minnesota, the lad who was the playmate of the now famous Mayo Brothers of Rochester, the apprentice in the drug store of the father of these two gifted men, the student at Philadelphia who sat at the feet of Procter, Maisch and Remington, the eminently successful business man in England and throughout the world The British philanthropist and archæologist who received the accolade of Knighthood from his appreciative Sovereign

The Remington Medal was then presented with the following words

Sir Henry In the name of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION I have the great honor of presenting you with this, the 1934 Remington Honor Medal I congratulate you upon receiving this distinction I congratulate the AMERICAN PHARMACEUTICAL ASSOCIATION upon so worthy a son of American Pharmacy, so faithful a member of our ASSOCIATION, so eminent a citizen of the world upon whom to bestow the highest gift that it offers its sons and daughters

Sir Henry S Wellcome, the recipient of the Medal, briefly and feelingly acknowledged the honor, referring to Professor Remington as member of the faculty of Philadelphia College of Pharmacy when he was a student of that institution He also paid tribute to William Procter, Jr , John M Maisch, Robert Bridges and other pharmaceutical educators of that period He concluded with words of thanks and appreciation and accepted the Medal as a distinctive honor

This concluded the ceremonies of the evening and many of the guests of this interesting event remained to enjoy the ball and program of music arranged for them by the Entertainment Committee

DR CHARLES MOORE

DR H A B DUNNING

The chairman of the present Campaign Fund Committee has been asked to assume the chairmanship of the Maintenance Committee for the American Institute of Pharmacy

PROCEEDINGS OF THE LOCAL BRANCHES

'All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association except with the consent of the Council" —Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads The objects and aims of local branches of this Associa tion shall be the same as set forth in ARTICLE I of the Constitution of this body *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association '

ARTICLE IV of Chapter VII reads Each local branch having not less than 50 dues paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting and the proceedings of which shall have been submitted to the JOURNAL for publication may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

BALTIMORE

The regular monthly meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Hotel Emerson Monday, April 23rd, at 8 15 P M , Vice-President Reindollar in the chair

The Chair called for a report of the last meeting which was read by the secretary An nouncement of the chairmen of the standing committees for the year was made as follows *Com mittee on Membership* Gilbert Joseph, *Committee on Professional Relations,* Simon Solomon, *Com mittee on Science and Practice of Pharmacy* Robert S Fuqua, *Committee on Education and Legis lation* A G DuMez

A communication from Secretary E F Kelly of the A PH A was read Dr Krantz in troduced the speaker of the evening Dr A R L Dohme who spoke on Germicides" He traced the early work of Pasteur Koch and Klebs and other famous bacteriologists and related how the first germicides were developed He mentioned the early work on iodine, iodoform, mercury, gold, the dyestuffs, Atoxyl, Ehrlich's 606 phenyl mercuric nitrate, the phenol germicides, the organic mercurials, chlorine compounds, and finally related in an interesting way the discovery of the anti septic properties of the alkyl resorcinols

At the conclusion of the address a rising vote of thanks was tendered Dr Dohme

Before closing the meeting a vote was taken on the appointment of a delegate and an alter nate to the House of Delegates of the AMERICAN PHARMACEUTICAL ASSOCIATION at the May meet ing President B Olive Cole was elected to serve as delegate and Secretary Treasurer C Jelleff Carr was elected to serve as alternate

C JELLEFF CARR *Secretary Treasurer*

CHICAGO

The monthly meeting of the Chicago Branch was held Tuesday, April 17, 1934, at the University of Illinois College of Medicine

The speaker of the evening was Dr Bernard Fantus, assisted by the Misses Hattie and Josephine Dyniewicz

Dr Fantus chose as his subject "A Study of Vehicles for Medicines"

Each member of the audience was presented with an outline of the vehicles to be discussed

Dr Fantus began his discussion with the statement that he thought medicine in a solid form had many advantages over those of liquid form but that we must have good vehicles for medicines not subject to solid administration

Some of his outstanding remarks were—the hope that the day will soon come when no nasty medicine will be prescribed that there is almost a specific vehicle for every medicament

It was shown with Syrup of Acacia that colloidal substances lessen the sharpness of taste of drugs The syrup was flavored with oil of wintergreen

Artificial Syrup of Cherry was presented it being proposed that we need more fruit flavors that this syrup is always uniform and quite suitable for the administration of acids Hydrochloric acid was used to demonstrate its masking properties

Syrup of Chocolate, with oil of theobroma added, was discussed The Pure Food and Drug Act allows the syrup to be called 'of chocolate" only when the oil is present

Syrup of Cinnamon—artificial, was next presented This syrup was proposed to have the advantage over the present U S P product in that the tannins of the crude drug would not be present The syrup was made by saturating syrup with the oil of cinnamon Iron and ammonium citrate were used to show the power of masking of taste of the syrup

Aromatic Syrup of Eriodictyon was exhibited as the best vehicle for alkaloids " It was shown that the disguising property of the syrup lies in the resins of the drug

Syrup of Strawberry—this syrup was made from the natural fruit juice and methenamine was used as the medicament to show its power of disguising taste

Aromatic Syrup of Glycyrrhiza was suggested to take the place of the present N F formula It was propounded that only the first fifty per cent of extraction be used in order to avoid the extraction of the acrid principle The revised formula would also contain an anise bouquet to enhance the taste of the glycyrrhiza Salty medicaments were used to show the special disguising powers of the syrup

Compound Syrup of Sarsaparilla was shown to become much clearer with the reduction in quantity of oil and Syrup of Bromides N F was cited as an example

Isoelixir an elixir of the same alcoholic concentration as the menstruum of the preparation for which it is to serve as the vehicle was demonstrated This elixir is made by mixing in the correct proportions 'Elixir Aquosum and "Elixir Alcoholicum "

Alkaline elixir of Eriodictyon was suggested as a new formula requiring a vehicle of a high alcoholic concentration

It was shown that many bitter substances more soluble in alcohol than in water lose their bitter taste in proportion to the higher per cent of alcohol present in the vehicle

Phenobarbital was shown as an example where this holds true

Dr Fantus concluded the report by answering the questions of the audience and inviting those present to inspect and taste the vehicles presented

LAWRENCE TEMPLETON *Secretary*

A paper on 'The Coöperation of the Hospital Pharmacist and Staff " by William Gray has been received and will be published in a later issue of the JOURNAL Articles by Dr Bernard Fantus and co workers on vehicles must also be deferred to a succeeding number —*Editor*

NEW YORK

The length of this interesting report prevents complete publication in this issue of the Journal

A meeting to commemorate the Fiftieth Anniversary of the New York and Brooklyn Formulary was held by the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION on Monday evening, April 9 1934 As usual the meeting took place in the College of Pharmacy, Columbia University About seventy five members and their guests attended

After the meeting had been called to order by the President Dr Ballard the report of the secretary was heard This was read, amended and accepted The treasurer's report was read

Due to the illness of Mr Lehman, a report from the Committee on Education and Legislation was rendered by Mr Dyer His report follows

Assembly bill 417 amending the pharmacy laws by permitting the Board of Pharmacy to control the manufacture and sale of all medicines (including proprietaries) which are of a poisonous, deleterious and habit-forming nature has been passed in assembly The original bill called for 'containing poisonous deleterious and habit forming ingredients" but it was amended in the assembly this has weakened the bill The prospects for its adoption by the Senate are good

National Recovery Administrator Hugh S Johnson has issued an order, effective April 8th tightening the loss limitation" provision in the code for the retail drug trade The order reads

Inasmuch as the vast preponderance of drug store products is distributed through small drug retailers who are unable to purchase on a quantity basis but who perform services which are essential to the welfare of those in their communities, and whereas such services cannot adequately be performed through the facilities provided by their competitors, and whereas, in some cases sales are made to consumers by such competitors at prices below the lowest cost of purchase normally obtainable for such merchandise by small drug retailers and whereas in most instances such sales prices are not a true indication of the general level of prices of such competitors and no general benefit to those in the community accompanies the same, but such prices are in fact in the nature of bait offers of merchandise to attract trade, it is hereby declared an unfair trade practice and is prohibited by this code for any drug retailer to sell any drugs, medicines cosmetics toilet preparations or drug sundries at a price below the manufacturer s wholesale list price per dozen, provided, however that in the case of biologicals or other of the above mentioned products which are not customarily sold in dozen or greater lots the Code Authority may fix a comparable unit quantity and provided further that any discount free deal or rebate which is made available to all purchasers of dozen lots or comparable quantities, shall be considered as part of the manu facturer s wholesale list price '

Following Mr Dyer's report considerable discussion developed in which Messrs Wm C Anderson E F Kelly J Seley and Fred Schaefer took part

Chairman Kassner, of the Professional Relations Committee next reported on the Physicians and Pharmacists' meeting recently held by the Academy of Pharmacy at the Academy of Medicine

A special report was received from Chairman H H Schaefer, of the Remington Medal Committee, who announced that Sir Henry Wellcome had been awarded the Remington Medal for 1934, the presentation to take place at the Convention of the AMERICAN PHARMACEUTICAL ASSOCIATION in Washington

The chairman then proceeded with the special program for the evening and called upon Dr Charles F Schleussner, one of the two surviving members of the original New York and Brooklyn Formulary Committee to tell about the early organization and development of a formulary which has grown to become the National Formulary (This will be printed in a later number of the JOURNAL)

A letter from Dr John Uri Lloyd commenting on the occasion was then read The complete text of the letter will be included in a further report —*Editor*

Dr H V Arny was next called upon to represent the New York College of Pharmacy Dean Arny called attention to the exhibit of all editions of the National Formulary, the New York and Brooklyn Formulary and to Lloyd's Elixirs which were on display Several of these books had been presented by members of the early formulary committees Dean Arny went on to say that the Formulary Committee membership list was literally made up of a pharmaceutical hall of fame with such names as Ebert, Hallberg Hoffmann and others Dean Arny also discussed briefly the methods employed for carrying out revisions of the National Formulary and he closed his remarks by explaining the broadening of scope which had taken place

A brief communication relative to the celebration from Dr Robert L Swain President of the AMERICAN PHARMACEUTICAL ASSOCIATION, was now read

Following this President Ballard introduced Dr Evander F Kelly, secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION who addressed the meeting This is held over for a later report

After Secretary Kelly's address letters from Chairman Gathercoal and Secretary Nichols of the Sixth Revision Committee of the National Formulary were read Chairman Gathercoal had also submitted a report on progress of revision This will be reported later

Following this there was some slight discussion and after a rising vote of thanks was extended to all speakers, Mr Fred Schaefer called the meeting closed

RUDOLF O HAUCK, *Secretary*

PHILADELPHIA

The April meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the auditorium of the Philadelphia College of Pharmacy and Science, April 10 1934

President Barol called the meeting to order, and the minutes of the previous session were read and approved In the absence of the chairman of the membership committee Dr Frank Eby proposed the following for membership in the local branch F R Greenbaum, David J Phillips and Albert C Moreau

President Barol then announced the committee appointments for 1934–1935 *Committee on Practical Pharmacy Chairman*, Quintus Hoch, Leo G Penn, George T Pickett *Committee on Professional Relations Chairman*, H Everett Kendig, Wilmer Krusen, W L Cliffe *Committee on Membership Chairman* George K Schacterle, Frank H Eby, Frank F Law, W J Stoneback, Harvey P Frank, Adley B Nichols *Committee on Entertainment*, George E Byers, *Chairman*

The principal speaker of the evening was Sergeant W C Leinhauser Chief of the Narcotic Squad of the Philadelphia Bureau of Police, who spoke on the illicit trade in narcotics in the vicinity of Philadelphia

He began by displaying various opium pipes devised by opium smokers from such common place articles as beer bottles, perfume bottles and tin cans easily destroyed when expecting a visit from the narcotic agent It was explained, however that opium smoking is a thing of the past most of the addicts now using crude hypodermic injections of morphine

Between 2000 and 3000 addicts and former addicts are now living in the vicinity of Philadelphia and among the last 200 arrests 90 per cent had been arrested three or more times for larceny Theft is the chief means the addict uses to obtain funds for narcotic drugs

Sergeant Leinhauser described the various methods used by traffickers in narcotics in smuggling them into the city Most of Philadelphia's supply is brought from New York and peddled in small amounts to users the packages often being disguised as various insignificant articles

The speaker made an appeal to the pharmacists of Philadelphia to aid in the enforcement of the narcotic act by observing the following precautions

1 Maintain careful narcotic records

2 Keep narcotic drugs in a locked cabinet at all times

3 Carefully scrutinize every narcotic prescription and the person who presents it In case of doubt as to authenticity, delay filling the prescription until the narcotic squad is notified

During the discussion after the talk Sergeant Leinhauser gave the following information

During his nine years as Chief of the Narcotic Squad he has made no seizure of codeine and knows of no primary codeine addicts

Since the Pennsylvania enactment against the use of Marihuana (referring to Cannabis) 30 persons possessing it have been arrested in Philadelphia Its use is mainly confined to the poor negro classes Sergeant Leinhauser has smoked this drug as an experiment but received no effect whatsoever

The selling of narcotics to school children is a myth and merely represents perennial material for newspaper stories Of the 175 to 225 arrests of users in this vicinity only a few are under 21 years of age

Very little opium is used by the Chinese population of Philadelphia and Chinese users do not abuse the habit The Chinese do not permit white people to frequent their quarters It is the opinion of Sergeant Leinhauser that once a person has become an addict he always comes back to the habit, even when supposedly cured

At the close of the meeting a rising vote of thanks was accorded Sergeant Leinhauser

E H MacLaughlin *Secretary*

PITTSBURGH

The Pittsburgh Branch of the American Pharmaceutical Association celebrated the twenty fifth anniversary of its founding with a dinner and joint session of the Pittsburgh Branch and the Pittsburgh College of Pharmacy Students' Branch, Tuesday April 10 1934

Dinner was served to seventy five members and guests at the Hotel Henry President Raymond Hornfeck introduced Robert R Gaw as toastmaster In his introductory remarks Mr Gaw stated that the 'Pittsburgh Branch was founded twenty five years ago at the Pittsburgh College of Pharmacy pursuant to the action of the Board of Trustees and that Dr Julius A Koch served as first president B F Pritchard was elected first secretary but resigned very

shortly after election and Dr Louis Saalbach was elected to fill the vacancy Dr Saalbach served as Secretary Treasurer until February 19 1929

The chairmen of the first committees were *Membership*, William R Bell, *Practice*, Louis Emanuel *Medical Relations* Albert F Judd *Education and Legislation*, John R Thompson, *Publicity*, James H Beal

Mr Gaw read a communication from Dr Julius A Koch to the effect that 'he would be absent from the city on the 10th and could not take part in the celebration of the twenty fifth anniversary of the founding of the Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION'

A communication from the parent body extending congratulations to the Pittsburgh Branch on the completion of twenty five years of useful service to Pharmacy was signed by R L Swain, E F Kelly and E G Eberle

The toastmaster called first on Dr Albert F Judd to tell something about early experiences of the society Dr Judd told about the contacts made with medical practitioners and problems encountered in the early period

Dr Louis Saalbach continued the relation of facts and told how the Pittsburgh Branch grew to its present position among pharmaceutical societies

Dr George D Beal Assistant Director of the Mellon Institute of Industrial Research, delivered the principal address He outlined the early history of the Branch and indicated the importance of the various local branches in the work of the parent association, he read excerpts from the code of ethics of the AMERICAN PHARMACEUTICAL ASSOCIATION to illustrate the fact that its principles are so fundamental and basic that they apply equally as well to day as they did when adopted over eighty years ago Dr Beal also pointed out the necessity for organization in our present economic scheme illustrating the need for local state and national units, but clearly indicated the inherent danger of duplication of these units Dr Beal concluded by paying a glowing tribute to outstanding men in Pharmacy telling of his experience with some he had known personally pointing out that the various callings are not professions in themselves but become so according to the character of the men in them

President Albert Gabig of the Student Branch of the Pittsburgh College of Pharmacy, responded on their behalf

Dean C Leonard O Connell responded for the Pittsburgh College of Pharmacy Announcement was made that a meeting would not be held in May, but meetings will be resumed in September, 1934

FRANK S MCGINNIS, *Reporter*

A A C P AND N A B P DISTRICT NO 6

The Boards and Colleges of Pharmacy District 6 met in Fort Worth, Texas March 22nd in a one day session E M Joseph *national vice president*, presided over the meeting C B Allison, Dallas, Texas C M Brewer, Oklahoma City, H H Horst Stuttgart, Ark, Dr D B R Johnson Norman, Okla Frank A Milne, Pratt Kansas John A Weeks Ballinger, Texas Herbert W Parker Jonesboro, Ark, Dr W F Gidley Austin Texas, and Mac Childs Eldorado Kansas addressed the meeting, which followed a regular examination of the Texas Board at which time 210 applicants presented themselves

Herbert W Parker read a paper on 'The Difference in Examinations after Prerequisite Laws Become Effective' which was well received Social features included a banquet in honor of the visiting delegates at the Blackstone Hotel at which Josh Lee, the sage of the Southwest, was principal speaker, followed by a dance given by the druggists of Fort Worth The Texas Board of Pharmacy entertained with a luncheon in honor of the delegates and the druggists of Dallas entertained with a stag party at the Blackstone

CONSTITUTIONALITY OF DELAWARE PHARMACEUTICAL LAW

A test case is being made which involves the constitutionality of the Delaware pharmacy law on motion of Peoples Drug Stores, Inc, to quash an indictment charging the Company with alleged violation The Delaware statute is very similar to the former Pennsylvania Ownership law

ASSOCIATION BUSINESS

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary 2215 Constitution Ave , Washington, D C

LETTER NO 9

May 7, 1934

To the Member of the Council

The Second Meeting of the Council for 1933–1934 was held in the Shoreham Hotel, Washington, D C on Monday, May 7, 1934, beginning at 9 30 A M , with the following members present Hilton, Swain, Adams, Caspari, DuMez, Christensen, Eberle and Kelly

54 Committee on Finance The following report was submitted by Chairman Swain

The undersigned has attempted to carry on as best he could the splendid work done for a number of years by former Chairman Bradley and desires to record his appreciation of the effective services of Dr Bradley The financial affairs of the ASSOCIATION are conducted principally by Treasurer Holton and Secretary Kelly, with whom the chairman and members of the Committee have cooperated as fully as possible

'The routine work of the Committee has been carried on as heretofore and the Committee has no recommendations to submit

' In submitting the Budget for 1934 (See Item No 30 Council Letter No 5) a complete statement with respect to income and disbursements was given At that time an estimated list of receipts for 1934 was made and the Committee is gratified to report that if the ratio of receipts to April 30th is continued for the year, the estimated receipts will be realized The expenses for the period to April 30th are also being kept within the appropriation It is impossible as yet to give accurate information as to the cost of maintenance of the Building and this item will therefore be discussed later The expense of transferring the offices of the ASSOCIATION from Baltimore to Washington were charged to Miscellaneous Expenses and it probably will be necessary later to ask for an addition to this appropriation

The estimate of receipts provided for the transfer of $4500 from the accumulated interest of the Life Membership Fund to the Current Fund to balance the Budget It is too early in the year to estimate how much, if any, of this amount it will be necessary to transfer

The Committee believes the ASSOCIATION to be in an entirely sound condition financially '

The report was accepted on motion of Adams—Caspari and after a general discussion of the finances of the ASSOCIATION

55 Committee on Property and Funds Chairman Swain submitted the following report

In accordance with Article VI of Chapter IV of the By-Laws of the Council, the Committee on Property and Funds submits its report The Committee recommends to the Council the following banks and safe deposit vaults

DEPOSITORIES FOR FUNDS

The Baltimore Trust Company, Baltimore Md
The Baltimore National Bank Baltimore, Md
The Maryland Trust Company Baltimore, Md
The Merchants and Newark Trust Company, Newark, N J
The Boston Penny Savings Bank, Boston Mass

DEPOSITORIES FOR SECURITIES AND RECORDS

The Baltimore National Bank, Baltimore, Md —Safe Deposit Boxes
The Maryland Trust Company Baltimore, Md —Safe Deposit Boxes
The Merchants and Newark Trust Co , Newark, N J —Safe Deposit Boxes

'The Committee is pleased to again report that interest has been paid on all securities owned by the ASSOCIATION with one exception Interest on a $1000 Bond, due May 31, 1933, of the City of Detroit, in the Life Membership Fund, and amounting to $40 was not paid, interest due on this Bond on December 1933, was paid and no doubt the interest in default will be paid later

'As reported in Item No 24, Council Letter No 4, November 27, 1933 certain series of the Fourth Liberty Loan Bond 1933–1938, were called for payment at par on April 15, 1934 In accordance with motion passed by the Council, the treasurer and secretary sold these bonds at 101 and purchased uncalled coupon bonds of the same issue to replace at $101^{21}/_{32}$ Coupon bonds were purchased because they brought a slightly better price and because of the difficulty of transferring registered bonds as further issues are called Two $100 coupon bonds in the Headquarters Building Fund and one $100 coupon bond in the Procter Monument Fund, all in the same series, were sold and not replaced $5000 of the amount secured for bonds in the Life Membership Fund was transferred to the Current Fund

' The treasurer is keeping a separate account of all investments for the Headquarters Building property and equipment The amount to April 30, 1934, was $487,682 94

' The chairman of the Council, the secretary and treasurer were appointed a Committee to consider the most appropriate means of using the Franklin M Apple Fund which amounts to $1607 05 and which is now held in the Current Fund The Committee recommends that this amount be applied to the purchase of the furniture for the Reading Room of the American Institute of Pharmacy and that an appropriate plate be displayed in the Room

"A further payment of 20% was made on the balances in the Baltimore Trust Company and it is expected that further payments will be made later In the mean time the unpaid balances draw interest at 2%

'The Committee is pleased to report that the property and funds of the ASSOCIATION are in a very satisfactory status considering the conditions and the Committee has no changes to recommend at this time "

On motion of Caspari—Christensen, the report was received and the recommendations approved

56 Committee on Publications Chairman DuMez submitted the following report

"Your Committee on Publications respectfully submits the following report on its activities during the past year, and on the status of the ASSOCIATION'S publications

"*Journal* The total expenditures for the publication of the JOURNAL for 1933, including the Editor's salary, were $18,212 94 ($13,212 94 plus $5000) The total expenditures for 1932 were $19 955 51 ($14 955 51 plus $5000), which represents a decrease of $1742 57

The receipts of the JOURNAL for advertising, subscriptions, sale of single copies, reprints etc , for 1933 were $7900 The subscription credit received from non-headquarters building members less 20% for overhead amounted to $4334 26, making a total of $12,234 26 The total receipts for 1932 were $13 580 34 The receipts therefore, decreased by $1346 08

The total expenditures of $18,212 94, less the receipts of $12,234 26, show the net cost of the JOURNAL for 1933 to be $5978 68 The net cost for 1932 was $6315 17 The net cost of the JOURNAL therefore decreased by $396 49 from that of the preceding year

The JOURNAL has not escaped being affected by the depression However, the showing made in the past year and nine months indicates that conditions are improving In 1932 the net cost of the JOURNAL was $1532 61 above that of the preceding year In 1933, on the other hand, the net cost was $436 49 below that of 1932 The receipts up to May 1st of this year are $3782 91, whereas they were only $2902 59 at the same time last year This represents a gain of $880 32 If the expenses can be kept down, a further reduction in the net cost of the JOURNAL may be looked for this year

Following established custom, the publishing companies were requested early last fall to submit estimates on the cost of publishing the JOURNAL for the coming year The Mack

Printing Company of Easton, Pa , submitted the lowest estimate, and was again awarded the contract

Further details relative to the management and publication of the JOURNAL will be reported by Editor Eberle

'*Year Book* Volume 20 of the YEAR BOOK of the ASSOCIATION which contains the report on the progress of pharmacy for the years 1931–32 should be in the hands of the members by this time Three thousand (3000) copies were ordered to be printed

"The printer was rather slow on the job The manuscript for the 1931 volume was placed in his hands last summer, and the manuscript for the 1932 report was furnished him in December

' Certain journals were again abstracted for the Committee of Revision of the United States Pharmacopœia, and these abstracts were included in the reports on the progress of pharmacy To cover the cost of this work the Board of Trustees of the Pharmacopœial Convention again appropriated the sum of $1000

The printing binding etc was done by the Lord Baltimore Press of Baltimore, Maryland

'Work was begun some time ago on the volume for 1933 Much of the abstracting has already been done and it is hoped that the book will be ready for distribution by the end of September

National Formulary V Up to March 1 1934 a total of 49,126 copies of the National Formulary V were printed Of these 48 626 were bound in buckram and 500 were bound in leather Of the copies bound in buckram 48 211 have been sold and 80 copies have been distributed gratis Of the copies bound in leather 100 have been sold and 12 have been distributed gratis This leaves on hand with the J B Lippincott Company a stock of 335 copies bound in buckram and 388 copies bound in leather The Mack Printing Company has approximately 450 copies of the N F V which are now being bound in buckram for delivery to the J B Lippincott Company

Permission was granted to Dr Macfarlan to use portions of the text of the National Formulary V, in the preparation of a formulary for the Philadelphia County Medical Society, and to Dr R P Walton of the School of Medicine of Tulane University for the reproduction of three formulas in a syllabus of prescription writing intended for the use of students

Pharmaceutical Recipe Book Up to March 1,1934, 5000 copies of the Recipe Book had been printed and bound in buckram Of this number 4803 copies have been sold and 95 complimentary copies have been distributed, leaving a stock on hand of 103 copies During the period June 1, 1933 to March 1 1934, 317 copies were sold whereas only 278 copies were sold in the preceding 12 months

"500 copies of the Recipe Book, Series B were ordered recently to replenish the rapidly diminishing stock on hand

' In conclusion, your Committee extends thanks to those who have cooperated in promoting the interest of the ASSOCIATION S publications and expresses its appreciation of the fine cooperative spirit shown by the many pharmaceutical journals of the country in giving publicity to the ASSOCIATION'S activities '

The report was received on motion of Christensen—Adams

57 Use of the Text of the N F V As recommended by the Committee on Publications permission to use without charge portions of the Text of the N F V for partial reproduction was granted to the Philadelphia County Medical Society in its proposed formulary and to the School of Medicine of Tulane University in a syllabus of prescription writing for medical students provided the usual acknowledgment be printed on the title page of these publications on motion of Adams—Christensen

58 Editor of the Year Book The following report was submitted by Editor DuMez

'Volume 21 of the YEAR BOOK covering the calendar years 1931 and 1932 has just been distributed The fact that the volume did not make its appearance earlier is disappointing The manuscript for the first half was given to the printer last summer and that for the second half was furnished him in December

Work is progressing satisfactorily on the preparation of the volume for 1933 All assignments have been made and a considerable amount of abstracting has already been done A spe-

cial effort is being made to push the work to completion before the end of the year so that the abstracts can be carried in the JOURNAL beginning with 1935 It will hardly be possible to carry more than the abstracts for one year in the JOURNAL, so that it will be necessary to prepare another volume of the YEAR BOOK covering the literature for 1934

"If the work of the 1933 volume is completed by September, let us say there will be a period of three months remaining before going on a monthly schedule This will be sufficient time to get a good start on the abstracting for 1934 and it seems that it should be possible to complete it by the end of 1935 in spite of the fact that the work will have to be done along with the abstracting of the current literature for monthly publication

"This year was not a good time to begin the preparation of abstracts for monthly publications in the JOURNAL, as it was expected that the offices of the ASSOCIATION would be moved from Baltimore to the new Headquarters Building in Washington, and that it would take some time to get settled in the new quarters The offices have been moved as expected, and the Editor of the JOURNAL is getting his affairs in such shape that there is no good reason why we should not begin the preparation of abstracts on a monthly schedule by the first of next year This will give ample time to organize a staff of abstractors and to arrange for supplying them with the publications to be abstracted each month '

On motion of Swain—Eberle, the report was received

59 Editor of the Journal Editor Eberle read the following report

'The report of the Editor herewith deals with the business of 1933 and as report of previous years, is compared with the prior year 1932

"The expenses of the JOURNAL for 1932 were $14,955 51, the receipts were $8861 37 Deducting the receipts not including membership subscriptions from expenses shows a net cost of $6094 14 Add the Editor s salary and we have a cost of $11 094 14 The credit on membership subscriptions, not Headquarters members less 20% for overhead, which for 1932 is $4718 97 from the gross cost, $11 094 14, leaves $6375 17 net cost including the Editor's salary an average of 4990 copies were printed monthly, making a cost of about $1 27 per volume

"The total expenditures for the publication of the JOURNAL, for 1933, including the Editor's salary, were $18,212 94 ($13 212 94 + $5000) The total expenditures for 1932 were $19,955 51 ($14 955 51 + $5000) which represents a decrease of $1742 57

'The receipts of the JOURNAL for advertising, subscriptions sales of single copies, reprints etc , for 1933 were $7900 The subscription credit received for non Headquarters building members, less 20% for overhead, amounted to $4334 26 making a total of $12,234 26 The total receipts for 1932 were $13 580 34 The receipts have therefore, decreased by $1346 08

The total expenditures of $18 212 94 less the receipts of $12,234 26 show the net cost of the JOURNAL for the year to be $5978 68 The net cost for 1932 was $6375 17 The net cost of the JOURNAL has, therefore decreased by $396 49 over the preceding year

' The number of pages in 1932 was 1362 in 1933, 1310 The publication costs in 1932, $10 261 45, in 1933, $9107 44 Mailing costs of the JOURNAL in 1932 $655 21, in 1933 $599 51, mailing back numbers of the JOURNAL for 1932, $13 93 in 1933 $26 50 Engravings and photographs, other than included in Mack Printing Company account in 1932 $479 97, in 1933, $387 06 Binding JOURNALS in 1932 $43 50 in 1933 $25 75, stationery and office supplies in 1932, $86 73, in 1933, $69 20, clerical, in 1932 $1419 in 1933 $1242 Commissions on advertising in 1932, $554 08, in 1933 $488 22 Small miscellaneous items make up the remainder of the total expenses

' Detailed comparative receipts 1932 and 1933 The receipts for 1932 $8861 37, for 1933, $7900 Advertising in 1932 brought $5931 47, in 1933, $5241 92 Subscriptions in 1932 amounted to $939 91 in 1933 $903 53 it should be understood that we make every effort possible to bring subscriptions to memberships Single copies in 1932, $51 30, in 1933, $28 51 Reprints, in 1932, brought $1098 14 in 1933, $1038 79 Miscellaneous items amounted to $840 55 in 1932, in 1933, $687 25 In 1932 the National Association of Boards of Pharmacy contributed $80, none in 1933 The American Association of Colleges of Pharmacy contributed $300 in 1932 and the same amount in 1933 In 1932, J U Lloyd contributed $50 toward the expense of printing his fourth paper on Physics in Pharmacy and we have received $50 from him for the publication of the paper presented at Toronto The Conference of Pharmaceutical Association

Secretaries contributed $25 in 1932 toward the expenses of printing their minutes in the JOURNAL and a like contribution was made in 1933 The Conference of Law Enforcement Officials contributed $75 A number of reproductions of pictures and books have been made without cost to the JOURNAL and ASSOCIATION and the sum derived from the sales of these was contributed to the JOURNAL— The Laboratory,' Dr Power in His Laboratory,' 'Ground Breaking at Head quarters,' Proof Sheets of United States Pharmacopœia I ' 'New Nomenclature,' which, with contributions toward the expenses of the JOURNAL amounted, in 1932, to $459 05, in 1933, $222 50

In recent years the papers presented to the Sections have increased in number and some in the pages of the reports, as a result we have about 25 papers unpublished several of these lengthy, and a large list has been contributed for this meeting If it had not been for the earlier meeting of the ASSOCIATION most of these papers would have been published

As stated in the last report, among the papers in recent years have been those presented in partial fulfilment of work for degrees As then stated, it has occurred to the Editor that part of the expenses for papers of that type should be met by the authors There are two sides to the question, of course Another expense that should, perhaps in part be met by authors is when a large number of cuts are used Tabular matter should be summarized to an extent The JOURNAL has carried the expense of having reprints made of reports and minutes of meetings in connection with the annual convention for distribution at the sessions of the ASSOCIATION and for pharmaceutical publications Also abstracts have been mimeographed for like distribution more than one hundred have been prepared

A work of interest and value has been published, The Professional Pharmacy—an Analysis of Prescription Department Activities' by Frank A Delgrado and Arthur Kimball It is part of the National Drug Store Survey and published under and by authority of the U S Department of Commerce Bureau of Foreign and Domestic Commerce About 5000 copies of reprints have been sold and the amount received has paid for making them, but not for publication costs Fine publicity has been given by most of the pharmaceutical publications

Papers relating to U S P and N F revision work have appeared in the JOURNAL and cooperation has been given to research work of the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers Association

The contribution of the American Association of Colleges of Pharmacy is appreciated and thanks are extended to Dean C B Jordan, editor of the department, for his coöperation

The difference between receipts and expenses up to April 1st of last year and April 1st of this year is only $10 less this year than last The favorable difference would have been greater, but the cost of the reprints of Professional Pharmacy increased the expenses, this shows up in the larger receipts up to May 1st of this year The receipts up to May 1st of 1933 were $2902 59 and up to May 1st of this year $3798 24

Itemized receipts and expenses are in the hands of the secretary and these are included in the auditor's report Scheduled itemized lists of the receipts and expenses for 1933 were included in the January report 1934, to all members of the Committee on Publications

The Editor is thankful for the fine cooperation given him "

The report was received on motion of Adams—Kelly

60 Committee on Standard Program In a verbal report, Chairman Hilton reviewed the work of the Committee in connection with this meeting and explained why it was not possible to submit the program to the Council earlier, as is customary as well as the changes made necessary by the dedication exercises The report was received

61 Committee on Recipe Book Chairman Lascoff read this report

Chairman J Leon Lascoff submitted the following report Secretary E F Kelly reported that up to June 1st of last year 4487 books were sold and 420 copies were in stock This year he reports that up to March 1, 1934 4897 books were sold and 103 remain in stock, also an additional 500 copies have been ordered All 5000 copies have been sold from Series A and 9 copies from the 500 ordered

On March 12 1934 your chairman received the following letter from Mr J H Gardner of Lippincott and Company the distributors

' Each day we have been receiving a number of inquiries concerning the PHARMACEUTICAL RECIPE BOOK and some of the prospective customers say that they saw an article in one of the Pharmaceutical Journals

'The writer would like to have a copy of this recommendation if you can arrange to send it to him

' This is excellent publicity and already has resulted in five or six definite sales "

During 1932–1933, definite work was begun on the revision of the Recipe Book Seven bulletins were mailed to the members of the Committee In these bulletins were included 102 new formulas and a table of doses

During 1933–1934, ten new bulletins were issued which brought up the complete total to 173 formulas and 72 additional formulas are now under consideration

The First Edition of the Recipe Book contained a total of 1621 formulas consisting of 777 Pharmaceutical Formulas 373 Hospital Formulas 34 Dental Formulas, 66 Diagnostic Reagents and Clinical Tests 28 Veterinary Formulas 45 Photographic Formulas 184 Cosmetic Formulas, 45 Flavoring Extracts 69 Technical and Miscellaneous Formulas

The proposed revision up to date includes 245 additional formulas consisting of 121 Pharmaceutical Formulas, 15 Hospital Formulas 59 Dental Formulas and Cosmetic Formulas, 16 Diagnostic Formulas, and 34 Technical Formulas

Dr H A Langenhan asks the following questions which are very helpful to members of the Committee in determining which formulas are suitable for adoption (1) Is any formula submitted to be included? (2) Have these formulas been tried out? (3) Is there a demand for them? (4) What points shall be considered in voting on them?

In answer to the first question it is necessary that at least a $/_3$ majority of the votes be in favor of the formula, before it is adopted

In answer to the second question I may state that before any of these formulas are included in the Recipe Book Second Edition each will be tried out as were those formulas in the First Edition

Answering the third question no formulas have been presented unless there have been requests for same

As to what points shall be considered in voting there are many to be observed As stated in the Preface of the First Edition The purpose of the Recipe Book is to supply definite formulas for those preparations, outside of the official books that are in fairly common demand in the retail pharmacy and the hospital pharmacy

Dr Langenhan also asks why the Recipe Book should be a *receptacle* for formulas not used" in the National Formulary (referring to the deletions) That question is answered by this fact After the new edition of the N F is out for a few years comparatively few pharmacists will be in possession of the N F V Quite a number do not have N F IV and very few have N F III

On many occasions, I have been asked for formulas from both of these books In further connection with the deletions from the Formulary, Dr Scoville writes that he is in favor of including all of the articles from Part I of the N F but none of those from Part II Your Chairman agrees with Dr Scoville and also suggests deleting the fluidextracts The galenicals of Part I are much more useful than the crude drugs of Part II

With the reports mailed to members and included in this report a sheet is included on which members can designate the deletions and inclusions they desire A list of deletions follows, only those not printed in September JOURNAL page 904, are given which see

N F DELETIONS

Elix Anis
Elixir Glycrrh Aq
Elix Tong et Salicyl
Emuls Petrolat
Fldglycer Casc Sagr Arom
Formal Cresol
Lavat Ori
Liq Hypophos Co
Lot Alba Vet
Phenol Iodat
Pil Aloe et Asafoet
Pil Aloin Co
Pil Digit Scill et Hydrarg
Pil Opii et Plumb
Pil Rhei
Pulv Pancreat Co
Sol Mastic Chlorof Co
Sol Resin Chlorof
Sp Sinap
Syr Calc et Sod Hypophos
Acid Bromaur
Agaric
Allium
Alth Fol
Ammon Phos
Angel Fruct
Angel Rad
Antim Oxid
Asclep
Baptis
Boldo
Brayer
Bromum
Calc Lactophosp
Canel

Cass Fist
Centaur
Cerev Ferm Compr
Chirat
Cocillan
Coff Tos
Conium
Coptis
Cornus
Coumar
Crocus
Cypriped
Dext Alb
Droser
Dulcam
Eucalypt Gum
Farfar
Ferr Album
Ferr Lact
Ficus
Fucus
Galangal
Galega
Geran
Hæmatox
Ignat
Inula
Juglans
Kav
Lac Vaccinum
Magnes Chlorid
Malv Fol
Manac
Mastic
Melilot
Myric
Orthocresol
Ovi Album
Pareir
Passifl
Piment
Plumb Iod
Plumb Oxid Rub
Prunum
Querc
Quinid
Rubus
Rumex
Sassaf Med
Scopar
Senecio
Solan
Suc Pomor
Tamarind
Thuja
Tonga
Veratrin
Verbasc Fol
Zedoaria

On April 12, 1934 a letter was mailed to the members of the Committee informing them that the meeting of the members of the Recipe Book Committee would be held on May 9th at 12 30 P M Enclosed also were bulletins Nos 6 10 11, 12 14, 15, 16 and 17 The meeting had been called for the purpose of carefully considering the formulas already presented and to discuss their merits

A complete typewritten set of formulas, together with the names of the members voting has been compiled The result of their votes and comments have been assembled in a leather backed note-book of 200 pages

In the report of 1931–1932 at Toronto your chairman called attention to certain criticisms of the First Edition of the Recipe Book All will be taken into consideration and corrections will be made

Your chairman wishes to take this opportunity to express his personal thanks to the members of the Committee who have been so helpful with their criticisms and suggestions He also wishes to extend his appreciation to all the members of the AMERICAN PHARMACEUTICAL ASSOCIATION who have shown interest and who have cooperated in the work of revising the present edition of the Recipe Book Your chairman wishes to thank Secretary Kelly and Editor Eberle for their valued assistance

In conclusion I would like to state that with the number of formulas in the present Recipe Book, with their corrections, with the addition of approximately 250 new formulas with the new galenicals from the N F V which were deleted, the total number of formulas will be brought to approximately 2000

The A PH A Recipe Book, Second Edition together with the foregoing material will be the only Pharmaceutical Recipe Book of its kind It will prove of great value not only to the physician, the dentist, the pharmacist, the hospital pharmacy, but to the clinical laboratory, the cosmetician and to pharmaceutical manufacturers as well

On motion Adams—Eberle the report was received with the thanks of the Council for the splendid work of the chairman and his associates

62 Code for the Retail Drug Industry The president and secretary made a full report on the work of the ASSOCIATION in this connection the latter reporting as a member of the National Retail Drug Code Authority The subject was discussed at length by others present No action was required

63 Nomination of Honorary President Secretary and Treasurer Mr J K Lilly was nominated to the House of Delegates as Honorary President for 1934–1935 on motion of Swain—Caspari, E F Kelly as Secretary on motion of Swain—Adams and C W Holton as Treasurer, on motion of Eberle—Kelly

64 Annual Report of the Council to the House of Delegates Chairman Hilton and the secretary were authorized to prepare and submit the report on motion of Eberle—Adams

65 Election of Members On motion of Swain—Adams, the following applicants who were properly endorsed, were elected to membership

No 183, Morris Aaron Freedman, 52 Aborn St , Peabody Mass , No 184, Reginald D Dymond, 82 Dalhousie St , Brantford, Canada No 185 Robert A Timmel 14929 Tenth Ave , Whitestone, L I , N Y , No 186, William McKaba, 134 State St , Brooklyn, N Y , No 187, Seymour Stern, 991 President St , Brooklyn N Y No 188 Ada Johanna Bizzaeri, 324 E 116th St , Manhattan N Y , No 189 Herman J Steinberg, 2102 Bronx Pk N Y , No 190, Andor Hacker, 2474 Valentine Ave , Bronx, N Y , 191 Isidore Koenig 2963 W 23rd St Brooklyn N Y , No 192 S Alex Becker, 1699 Carroll St Brooklyn N Y , No 193, Nicholas V Arancio 423 E 80th St , New York, N Y , No 194 Herbert Bernstein, 1305—38th St , Brooklyn, N Y , No 195, Jack Zivin, 1321 Foster Ave Brooklyn N Y , No 196 Patrick Joseph Diskin, 2544 E 19th St , Brooklyn, N Y , No 197, Nicholas P Caridi 815 Woodward Ave , Ridgewood, N Y , No 198, Arthur J DeIanni, 354 E 119th St New York N Y No 199 Harry Wishinsky, 287 Henry St , New York N Y No 200, William Matz 1245 Harrod Ave New York, N Y , No 201, Armando Font, Jr , 46 Fort Washington Ave New York, N Y No 202, Harry Figatner, 173 Hooper Street Brooklyn, N Y No 203 Bernard Meyerson 214 Central Ave , Brooklyn, N Y , No 204 Libera Vasil Palmeri, 313—17th St Brooklyn N Y , No 205 Max Vogel, 82 E Park St , Long Beach N Y No 206, Joseph Brown Rogers New Albany, Mississippi, No 207 Edward Sacksman 632 Elizabeth Ave Elizabeth N J No 208, Eugene M Caskey, Box 696 Jacksonville, Texas, No 209 James Mitchell Chancy, 440 Washington St New York, N Y , No 210, John C Hood, Kinshan N C No 211 David Maistelman, 644 E 170 St , Bronx, N Y , No 212 Verne Willard Cowell 2911 M St , Lincoln Nebr , No 213, Otto Andreas Bjornstad, 396 West 4th St Spencer Iowa No 214 Thomas Meehan 2111–2115 E Susquehanna Ave Philadelphia, Pa , No 215 Albert C Fritz, 4101 E Michigan St , Indianapolis, Ind , No 216, Paul Buchanan Perrigo Allegan Mich No 217, C W Collins, 19th St and St Marys Ave , Parkersburg W Va No 218 W R Crane Fairmont, W Va , No 219, Jess A Reese, 2412 Grove Ave Richmond Va , No 220 Michael J Strassner, 24 Barbour St , Haledon, N J , No 221 Herbert Richard Hutchinson 65 Pillsbury Concord, N H , No 222, George R Arnold Box 471 Thermopolis, Wyoming No 223 Isidor Schnitter, 425 Washington St , Hoboken N J , No 224 John F Cosgrove 315 Ridge St Newark, N J , No 225, Samuel R Kleegon, 11363 N Martindale Detroit Mich No 226 Byron E Emery 370 Parnassus Ave , San Francisco, Calif No 227, Donald R Squier 14324 Jefferson St E , Detroit, Mich , No 228, Theo A Arneson, Montevideo Minn No 229 Buell Parker Bogan 1710 Douglas St , Sioux City, Iowa, No 230 Martin F Haberle 250 Langdon St , Madison Wis , No 231 Andrew Ruzeck 250 Langdon St , Madison Wis , No 232 Elizabeth Bohlson, 228 High St , Oshkosh, Wis , No 233, Stewart Irwin Lubcke Middleton Wis No 234 Lyman D Fonda, 600 Lafayette Ave Brooklyn N Y , No 235 Carl Hermann 21 W 6th Ave , Helena, Mont , No 236, Bernard Aaron 804 First Ave Elizabeth, N J No 237 Robb Vernon Rice, 510 McLeod Ave , Missoula Mont , No 238, Arthur Goldstein 720 W Main St North, Gainesville, Florida, No 239 Robert L White 25–27 Hernando St Gainesville Florida No 240, John F Mayer 1600 Shattuck Ave , Berkeley Calif , No 241, Victor C Piaskowski 7542 Michigan Ave , Detroit, Mich , No 242 Conda H Diehl 102 W Main St , Mechanicsburg Pa No 243, N Clark Clement, 61 Brook St , Wellesley, Mass No 244 Clemente A Tarallo, 93 Greenside Ave , White Plains N Y , No 245 Anthony John Zolenas Jr 1619 Spence St Baltimore, Md , No 246 Seymour B Dewey, 1148 Williams Rd , Cleveland Ohio No 247, Milton E Cohen, 100 Crooks Ave , Clifton N J , No 248 Camille Masucci 34 Ward Paterson, N J , No 249 Virginia Mae Powelson 171 Franklin Ave , Hasbrouck Hts N J No 250 Loreta Artese Paganelli, 288 Highland Ave Orange N J , No 251, Carson P Frailey 506–507 Albee Bldg , Washington D C , No 252, Dallas Ewing Billman 15—4th St , Paterson, N J , No 253, Louis M Roeg 428 Summit Ave , Westfield, N J

66 Election of Honorary Member Mr Charles Moore, chairman of the Commission of Fine Arts was elected an Honorary Member, on motion of Swain—Caspari

67 Honorary and Corresponding Members The secretary read a letter from Dr Edward Kremers containing several suggestions with respect to these classes of membership After a

general discussion, the Chairman and Secretary of the Council and the Editor of the JOURNAL were named as a special committee to make a study of the question and to report to the Council at the next annual meeting, on motion of Adams—Swain

The Third Meeting of the Council for 1933–1934 was held in the Shoreham Hotel on Thursday forenoon, May 10th, with the following members present Hilton Beal Dunning, LaWall Adams Fischelis DuMez Eberle and Kelly Sir Henry S Wellcome attended by invitation

The minutes of the Second Meeting were approved as read

68 Committee on Student Branches Chairman W Bruce Philip presented a verbal report On motion of Beal—Eberle the report was received and the recommendation approved that there be named a faculty advisor for each student branch or an advisor approved by the faculty

69 Food and Drug Legislation Dr Beal discussed the probable effect of S 2800 and other bills on the status of the U S P and N F A general discussion followed but no action was taken

70 Proposed Council on Pharmaceutical Practice By invitation Dr E Fullerton Cook presented a proposed plan for establishing such a Council under the auspices of the A PH A After a general consideration of the subject, the chairman was authorized on motion of Beal—Eberle to appoint a special committee for the Council to consider the proposal and to later report to the Council

71 Committee on Research The secretary read the following report as submitted by Chairman Arny

'Your committee conducted its business during the year by means of three Bulletins and held a meeting at Hotel Shoreham on May 9th with 8 of its members in attendance

'At this meeting, the following resolutions were passed

'*Resolved*, that the committee recommend to the Council and to the ASSOCIATION that the Research Grant for 1934–1935 ($1000) be awarded to W J Husa and his associates at the University of Florida for a continuance of their research on extraction

Resolved, that the committee recommend to the Publication Committee that the papers on extraction presented by Dr Husa at this 1934 meeting, embodying the results of work performed by him in 1932–1934, be published in the A PH A JOURNAL as promptly as possible The committee further suggests that if feasible a sum not to exceed $150 be drawn from the A PH A Research Fund to pay the cost of publication of these extraction papers'

After discussion the report was received and the recommendations approved on motion of Beal—Fischelis

72 Commission on Proprietary Medicines Chairman Beal verbally reported progress and suggested that the Commission might give study to the proposal to limit the preparation of medicines to registered pharmacists The report was received and the suggestion approved on motion of Dunning—Adams

The Fourth Meeting of the Council of 1933–1934 was held in the Shoreham Hotel on Friday evening, May 11, following the final General Session Chairman Hilton and Messrs Beal Dunning, Adams, Fischelis, Krantz Holton Eberle DuMez and Kelly were present

The minutes of the Third Meeting were read and approved

73 Committee on National Formulary The secretary submitted the following report for Chairman Gathercoal

'The National Formulary Revision Committee elected in 1929 at the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION is now in the fifth year of its activities

'The organization of the Committee by the election of its chairman and secretary was completed late in 1929 and the first page of the National Formulary 'Bulletin" was issued January 8, 1930 The first report of the chairman of the National Formulary Committee was presented to the Council early in May 1930 This first report dealt largely with certain suggestions regarding Scope and especially regarding a further development of interest in the National Formulary among physicians and among pharmacists Three specific features of this first report might be mentioned at this time, namely

(*a*) An active undertaking to determine the 'Extent of Use' of N F V preparations in hospital pharmacies large prescription pharmacies and ordinary drug stores and as manufactured by the leading pharmaceutical manufacturing houses

"(*b*) A definite request for research in connection with National Formulary preparations

(*c*) A leading intimation that the actual money expenditure in connection with the Revision should be markedly increased over what had been spent in previous Revisions, in fact, the sum of $40,000 was mentioned in this connection

' That the Council may have a fair idea of what has been accomplished along these three lines, permit me to present the following statement relative thereto

' (*a*) In reference to determining the Extent of Use' of drugs and medicines as a guide to the Committee regarding admissions to N F VI three great surveys have been executed, one on the use in pharmacies of N F V preparations, one on the use in pharmacies of unofficial preparations and one on prescription ingredients A fourth survey on the number of prescriptions annually compounded in the United States was initiated and successfully carried through in connection with other pharmaceutical organizations The total cost of these several surveys has never been completely separated from other N F expenses or accurately computed but certainly it is several thousands of dollars, possibly, counting the $500 donation from the U S P Board of Trustees and the great amount of material contributed by the National Drug Store Survey (St Louis), as much as $10 000

' (*b*) Regarding National Formulary research, while several small appropriations have been made from the A PH A Research Fund and while a considerable amount for research has gone through the N F General Expense Fund, yet your chairman has been definitely disappointed in the small amount of contributions that have been made toward research on important N F problems Most of the really important research contributions have come from private sources without any financial contributions from the A PH A and, in fact hardly an acknowledgment by the A PH A of this important work It would be but fair for me to say that the cost of research contributions made by the pharmaceutical manufacturing firms to the ampul monographs and to the tablet monographs of N F VI exceed by five times over the total monies appropriated by the AMERICAN PHARMACEUTICAL ASSOCIATION for research on N F VI monographs during the past four years However, the total volume of research on N F VI monographs has been surprisingly large and will be reflected in the revised work In this connection mention should be made of the very splendid contributions by Dr H W Youngken other Pharmacognosists, and certain Pharmacologists to the several new monographs on glandular products that will appear in N F VI

"(*c*) The cost of the present Revision of the National Formulary as compared with the cost of previous Revisions has, no doubt caused considerable astonishment and even alarm to officers of the AMERICAN PHARMACEUTICAL ASSOCIATION However this cost is still far below the estimate of $40,000 that was given you five years ago, and the total cost of the Revision probably will not be more than 25 per cent of the U S P Revision costs

' During the first year of revision work a meeting of the Committee was held near Cleveland, Ohio at which Rules of Business Procedure and General Principles of Revision were extensively discussed and adopted Tentative admissions of about 400 items were made and the complete organization of the Revision work was set up

' During the year 1931, marked activity prevailed in the nine Sub committees and a preliminary review of practically all of the admitted monographs was made A second meeting of the Committee was held at Pocono Manor Inn in June 1931 at which splendid data on the extent of use of N F V preparations and of unofficial preparations were presented Final action was taken on about 500 admissions to N F VI Important work was done in the Sub-committee meetings, and the number of pages of the N F Bulletin increased to 350, and of the Sub-committee Letters to about 400 pages by the end of 1931

' During 1932 the Sub committees reported extensively on their monograph work, and the number of pages of the Bulletin increased to about 650 No Committee meeting was held during this year, but a vast amount of work was given to the completion of the several surveys on the extent of use of medicines in the United States

' During 1933 a very large number of the monographs appeared in the Bulletin, and the number of pages of the Bulletin increased to about 1350 During this year also the Prescription Ingredient Survey' was published in book form By the end of the year at least 400 monographs out of about 700 were definitely reported out from Sub-committees and were ready for the Editorial Committee

"Since the first of 1934 many more monographs have been declared completed by the Sub committees, and the editorial work has been progressing rapidly At the present date all of the 110 monographs assigned to the Sub committee on Pharmacognosy have been completed, published in the Bulletin and have been practically completed from the editorial standpoint All of the 88 monographs assigned to the Sub committee on Chemistry have been completed and published in the Bulletin and have been largely finished from the editorial standpoint All of the 144 monographs assigned to the Sub committee on Extractive Preparations have been published in the Bulletin have been reviewed in 'First Proof' by Chairman Scoville and are practically ready for the printer There are possibly three or four of these monographs not yet finished This Sub committee has also prepared the proximate assays and these assay processes have been published and criticized and are ready for inclusion in the monographs All of the 27 ampul monographs have been published and republished in the Bulletin They have been very extensively criticized and many comments have been received recently as to the satisfactory appearance of these monographs Sub-committee No 3 on the Solution Preparations (elixirs solutions syrups, waters) has had perhaps the most difficult assignments of any in connection with the N F Revision There are still a considerable number of unfinished problems in this Sub committee though a vast amount of work has been done by the Sub committee Most of their monographs have been published in the N F Bulletin The other Sub committees have largely completed their assignments except the special Sub committee on Tablets This Sub-committee in charge of Professor Nichols has been assigned an enormous amount of work, and unfortunately was organized much later than the other Sub-committees However, we feel confident that during the coming summer this Sub committee will get most of its monographs into the Bulletin and in a very satisfactory form

In concluding this report, the Chairman of the N F Revision Committee will advance no particular suggestions or proposals We have no new projects in mind and our only aim now is to satisfactorily complete the work and get it into the printer's hand as rapidly as possible We look forward to the publication of the Revised Edition at as early a date as possible and really greatly desire to see the new U S P and the new N F made official July 1, 1935 Perhaps however this is an impossibility

' No budget or proposal of expenditures will be presented at this time It is expected that the general office expense and the Bulletin publication expense will be about the same during the next year as in the past year "

On motion of Kelly—Eberle the report was received with thanks to Chairman Gathercoal to the Committee on N F and to all who have coöperated with them in preparing the text of the N F VI

74 Headquarters Building Chairman Dunning referred to the splendid coöperation that Mr J O Shumate of the George A Fuller Company, has given in connection with the erection of the headquarters building and which should be suitably acknowledged On motion Dunning—Krantz, it was ordered that an appropriate certificate be prepared and delivered to Mr Shumate and that later he be given an honorarium of $100 from the Headquarters Building Fund

75 Election of Members The following applicants were elected to membership on motion of DuMez—Dunning

No 254 Jose Menendez Girogetti St , No 1 Rio Piedras Puerto Rico, No 255 Burton K Murdock 10 Main St , Kennebunk Maine No 256 Joseph P Maile 522 Ocean Ave Brooklyn N Y , No 257, Purcell Smith Country Club Station Little Rock Ark , No 258 R H Wagner, 3300 Garrison Blvd , Baltimore, Md , No 259, M B Wagner 400 W Baltimore St , Baltimore, Md , No 260 J Jephson, 15519 Waterloo Rd , Cleveland Ohio No 261, Joseph J Opatrny, 3789 E 131st St Cleveland Ohio, No 262, Bliss Clark Wilson, Letcher S Dak

The chairman declared that its work was completed and that the Council for 1934–1935 was adjourned

E F Kelly, *Secretary*

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary 2215 Constitution Ave Washington D C

LETTER NO 1

May 11 1934

To the Members of the Council

The reorganization and First Meeting of the Council 1934–1935 was held in the Shoreham Hotel, Washington, D C on Friday, May 4 1934 beginning at 11 15 P M

1 The roll was called and the following were present Hilton Beal, Dunning Philip Adams, Fischelis, Geo D Beal Kelly, Eberle and DuMez

2 Election of Chairman S L Hilton was elected Chairman of the Council for 1934–1935 on motion of Dunning, seconded by Geo D Beal and carried

3 Election of Vice Chairman J H Beal was elected Vice Chairman of the Council for 1934–1935 on motion of Philip, seconded by Dunning, and carried

4 Election of Editor of the Journal E G Eberle was elected Editor of the JOURNAL for 1934–1935 on motion of Geo D Beal, seconded by Kelly and carried

5 Election of Editor of the Year Book A G DuMez was elected Editor of the YEAR BOOK for 1934–1935 on motion of Eberle, seconded by Philip and carried

6 Membership of the Council The membership and officers of the Council for 1934–1935 are as follows

ELECTED MEMBERS

J H Beal, Fort Walton, Fla (Term expires 1935)
C E Caspari, Euclid and Parkview Aves, St Louis, Mo (Term expires 1935)
C H LaWall, 214 S 12th St, Philadelphia, Pa (Term expires 1935)
H V Arny, 115 W 68th St, New York, N Y (Term expires 1936)
H C Christensen 130 N Wells St, Chicago, Ill (Term expires 1936)
W D Adams Forney, Texas (Term expires 1936)
H A B Dunning Charles and Chase Sts Baltimore, Md (Term expires 1937)
S L Hilton, 1033 Twenty Second St, N W, Washington, D C (Term expires 1937)
W Bruce Philip, Munsey Bldg Washington, D C (Term expires 1937)

EX OFFICIO MEMBERS

R P Fischelis, 28 W State Street, Trenton N J
Geo D Beal, Mellon Institute Oakland Station Pittsburgh, Pa
Oscar Rennebohm, 550 W Washington Ave Madison, Wis
E F Kelly, 2215 Constitution Ave, Washington D C
C W Holton, Box 81, Essex Fells N J
Rowland Jones Gettysburg, S Dak
E G Eberle, 2215 Constitution Ave, Washington, D C
A G DuMez Lombard and Greene Sts Baltimore, Md

OFFICERS OF THE COUNCIL

S L Hilton *Chairman*
James H Beal *Vice Chairman*
E F Kelly *Secretary*

7 Finance Committee Chairman Hilton appointed W Bruce Philip *Chairman*, C H LaWall and C W Holton as members of the Committee on Finance, and these appointments were confirmed on motion of Dunning, seconded by Fischelis and carried

8 Committee on Property and Funds The personnel of this Committee as provided for in the Council By Laws, is as follows for 1934–1935 R P Fischelis C W Holton S L Hilton W Bruce Philip and E F Kelly

9 Committee on Publications Chairman Hilton appointed H V Arny, C H LaWall and Walter D Adams as members of the Committee the other members being E G Eberle, E F Kelly, A G DuMez and C W Holton, as provided in the By Laws These appointments

were confirmed on motion of Philip seconded by Dunning Chairman Hilton appointed A G DuMez as *Chairman* of the Committee on Publications

10 Committee on Standard Program The chairman appointed S L Hilton, T J Bradley and E F Kelly as members of the Committee on Standard Program

11 Committee on Year Book The chairman appointed the following members Geo D Beal, *Chairman*, T W Nitardy, H W Youngken, E N Gathercoal, E E Swanson, J C Munch and J C Krantz Jr

12 Executive Committee of the Council It was moved by Philip that the chairman be authorized in case the occasion should arise to appoint an Executive Committee consisting of seven members The motion was seconded by Eberle and carried

13 Committee on Pharmaceutical Research On motion of Dunning seconded by Philip and carried W J Husa and Geo D Beal were elected members of this Committee to serve until 1939

14 Commission on Proprietary Medicines S C Henry was elected a member of this Commission to serve until 1939, on motion of Dunning, seconded by Philip and carried

15 Committee on Recipe Book After a general discussion it was moved by Fischelis that the Committee on Recipe Book be continued for one year The motion was seconded by Eberle and carried

16 Appointment of Standing and Special Committees and Delegates of the Association The president was authorized, on motion of Philip, seconded by Eberle and carried to make such appointments, as are now authorized, to fill vacancies as they may occur, and to make additional appointments as may be necessary or advisable during the year

17 Membership in and Work of the Association There was a lengthy consideration of these subjects with particular relation to the discussions of membership by the House of Delegates and the Conference of Pharmaceutical Association Secretaries No action was taken other than to authorize the secretary to withdraw from certain activities when and if this course becomes advisable and to confer with a committee representing the Conference of Pharmaceutical Association Secretaries

18 The Cost of the Headquarters Building Approach, Equipment and Grounds Chairman Dunning reviewed the information given in his reports covering the period since the property was purchased The cost of the building came within the contract price The widening of Constitution Avenue to eighty feet and of Twenty Second and Twenty Third Streets, made it necessary to revise the plans for grading and for the approach and for the planting and increased the cost of each of these items These additional costs amount to approximately $35 000 more than the collections to date, and it was necessary to incur them to satisfactorily meet the enlarged plans of the Government for the area adjoining our site Chairman Dunning recommended that pending further collections, the ASSOCIATION borrow this amount at 4% on a note which we will endorse and advised the Council that he had made arrangements for the temporary loan with the Maryland Trust Company of Baltimore After general discussion, it was moved by Dunning that the proper officers of the ASSOCIATION be authorized to complete the arrangements as outlined above, for a loan of $35 000 at 4% interest with the Maryland Trust Company on a note of the ASSOCIATION endorsed by Chairman Dunning and to be renewed as necessary until further collections will liquidate the loan The motion was seconded by Fischelis and carried

19 Consideration of Various Reports, Resolutions and Recommendations Referred to the Council The secretary advised that a number of such communications had been referred to the Council some of them involving appropriations On account of the lateness of the hour it was not thought advisable to act on them and they were referred for consideration either by letter or at a meeting of the Council to be called later

The meeting then adjourned

E F KELLY, *Secretary*

"A Method for the Preparation of Parenteral Dextrose Solutions," by Harvey A K Whitney—Abstract of Paper, Scientific Section, A PH A

A discussion of the preparation of sterile dextrose solution for hospital use It includes a description of the distilling apparatus glassware sterilization and accessory, as well as hydrogen ion concentration control of the finished solution

EDITORIAL NOTES

Because of association matter in this issue a number of items were omitted from this department

A CENTURY OF PROGRESS

The International Exposition—A Century of Progress—opened May 26th and closes November 1st Indications are that this year the exposition will be greater than last year, additional exhibits have been included and improvements have been made in some of the entertainment features The Pharmacy Exhibit will be continued

ABSTRACTS OF PHARMACOPŒIAL LITERATURE

Another "Abstract of Scientific Literature" dealing with pharmacopœial subjects appearing in publications of 1933 has been prepared under the direction of F W Nitardy by E R Squibb & Sons Copies of these abstracts have been sent out with the compliments of the Board of Trustees of the U S P convention This abstract is issued as a supplement to the series of the U S P Revision A very limited edition has been published and all copies have been distributed to the libraries of medical and pharmaceutical colleges and may be consulted there no extra copies are available This is a most valuable contribution and has been abstracted by the staff of the Brooklyn Plant Library Miss E Pickering, Director and published under the auspices of the U S P Board of Trustees The abstracts have been taken from more than three hundred different Journals in the fields of medicine pharmacy chemistry and biology and constitutes a distinct service for pharmacopœial revision and the service of libraries and research workers

LEGIBLE PRESCRIPTIONS

A news dispatch from Berlin states that sickfund officials have complained to the government about physicians writing prescriptions so illegibly that pharmacists have difficulty in reading them The government has issued a general order to physicians to improve their handwriting

The same condition but evidently not to the same extent is brought out in the National Drug Store Survey issued by the Department of Commerce Bureau of Foreign and Domestic Commerce 'The Professional Pharmacy' published by the AMERICAN PHARMACEUTICAL ASSOCIATION presents the findings of an intensive survey among the strictly professional type of retail pharmacies, a detailed analysis of operations methods etc —A detailed analysis of nearly 24 000 prescriptions from selected drug stores—shows the importance of the prescription department in the operation of a modern retail drug store

DONATIONS

Daughters of the late Charles E Dohme Mrs E C True and Mrs C W Holton have presented to the museum of the American Institute of Pharmacy a beautiful counter scale which was used by the retail firm of Sharp & Dohme prior to the establishment of the manufacturing establishment under that name

Mrs C W Richardson of Washington, D C has presented a stone mortar from Sothorn's drug store in Georgetown, also an ointment jar from John Paul Jones' brothers' drug store in Fredericksburg

Lawrence Williams, of Baltimore, presented a representative number of show globes from his large collection He also donated several scales and balances ointment jars and mortars all of which made an attractive display in the museum of the A PH A headquarters

The display, by Chairman E Fullerton Cook of pharmacopœias and of circulars acquainted the visitors with the methods of revision and the tremendous amount of work and careful study involved in U S P revision and attracted much attention

Pharmacist J Leon Lascoff's collection of foreign prescriptions and of methods for finishing them forms an interesting display Mrs Whelpley s large assortment of badges is an interesting study in color art and association history

An unusual gift was made by James H Beal at a general session in the presentation of a fine specimen of Bezoar to the ASSOCIATION Further mention will be made of this valuable gift in reporting the proceedings of the meeting Charles H LaWall gave an historical account of Bezoar stones

PERSONAL AND NEWS ITEMS

Under the title of "The Consummation of Our Hopes and Dreams,' the *Druggists' Circular* for May published a chronological story of the erection of the American Institute of Pharmacy It is a valuable historical record

Senator Royal S Copeland addressed the Joint Meeting of the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy on Food and Drug Legislation during the A PH A convention

Prof Anton Hogstad, Jr, in speaking before Oklahoma Pharmaceutical Association, presented the following resolution which was adopted by the Association

Let it be resolved that the so called commercial pharmacy be designated by the title of drug and sundry merchandising, and that the so called professional pharmacy be designated by its proper title of pharmacy," the resolution says so that confusion will not exist in the minds of the members of allied professions and the laity as to the aims and purposes of pharmacy "

The office of the National Drug Clerk has been moved from their old location on S Dearborn St to the Civic Opera House at 20 N Wacker Drive

President Frank A Blair, of the Proprietary Association was given a testimonial dinner on May 23rd at the Waldorf Astoria New York City

Joseph W E Harrisson, Assistant Director of Research at Philadelphia College of Pharmacy and Science, has been reëlected President of the Philadelphia Institute of Consulting Chemists and Chemical Engineers

Former President A PH A, **Robert L Swain** delivered the address to the graduating class of the College of Pharmacy Columbia University, on May 24th He also will speak before the graduating class of Connecticut College of Pharmacy New Haven, on June 4th Classmates presented him with a silver flower bowl during the A PH A convention

Dean A G DuMez, dean of the School of Pharmacy, will be the guest speaker at the annual meeting of the Alumni Association School of Pharmacy, Rutgers University, Newark N J

The National Retail Drug Authority Washington, D C, has moved from the Tower Building to the National Press Building in Washington

L M Kantner has been appointed by Governor Albert C Ritchie to the Maryland Board of Pharmacy for a term of five years, beginning May 1934 He has been engaged in retail pharmacy ever since his graduation from the School of Pharmacy of the University of Maryland in 1909 He is a former president of the Maryland Pharmaceutical Association and the Baltimore Branch of the A PH A

JUNE STATE ASSOCIATION MEETINGS

Alabama, 19–21, Montgomery
Arkansas, 12–14 Texarkana
California, 3–7 Sacramento
Colorado, 12–14 Colorado Springs
Connecticut, 27–28 New London
Delaware, 27–28, Rehoboth Beach
Georgia, 12–14 Savannah
Idaho, 25–26 Lewiston
Indiana, 19–21 Lake Wewasee
Kentucky, 19–22 Paducah
Maine, 27–29, Belgrade
Maryland, 21–24 Baltimore
Massachusetts, 26–28 Swampscott
Michigan, 26–28 Pontiac
Mississippi, 18–20, Jackson
New Hampshire, 17–19 Portsmouth
New Jersey, 13–15 Asbury Park
New York, 21–24 Bolting Landing Lake George
North Carolina, 25–27, Durham
North Dakota, 13–15 Dickinson
Ohio, 24–July 1 Cruise on Great Lakes in S S *Octarara*
Pennsylvania, 19–21 Wernersville
Rhode Island, 25–26 Watch Hill
South Carolina, 20–21, Charleston
South Dakota, 11–13 Brookings
Texas, 18–21 Mineral Wells
Utah, 11–12 Ogden
Vermont, 17–19 Fairlee
Washington, 27–29 Tacoma
West Virginia, 11–12, Huntington
Wisconsin, 19–31 Fond du Lac
Wyoming, 25–26, Casper

The **Proprietary Association** met in New York City May 22–24

JAPAN PHARMACISTS UNION

The 12th annual convention of the Japan Pharmacists' Union was held at Shimizu Building Nihonbashi ku Tokyo on February 16th and 17th

OBITUARY

HERMAN A METZ

Herman A Metz, member of the A PH A and internationally known in the chemical industry, died May 17th, in a New Rochelle hospital, aged sixty six years He was born in New York City and educated in the public schools He attended night classes in chemistry at Cooper Union and completed the course As a youth he went to work for a chemical importer, later Koechl & Co When the firm was incorporated in 1893 Mr Metz became vice president and treasurer and when Mr Koechl retired Mr Metz acquired his interest The business was later incorporated under the name of H A Metz & Co He also organized the General Dyestuffs Corporation and in 1930, he organized the Advance Solvents & Chemical Corporation

Mr Metz was active for some time in politics serving the city as Comptroller and as a Congressman from Brooklyn from 1913 to 1915 He was also a member of the Board of Education for several terms and active in various municipal affairs He is survived by his widow and four sons

JOHN BLOCKI

John Blocki Honorary President of the Illinois Pharmaceutical Association and member of the A PH A died May 10th, after a lingering illness, aged eighty nine years He was one of the founders with T N Jamieson and Wilhelm Bodemann, of the Chicago Veteran Druggists' Association, in 1898

John C Robinson, Dallas, Texas, engaged in the wholesale drug business and as manufacturers representative for about sixty years died April 25th at his home in Dallas Texas aged seventy five years He graduated from the Maryland College of Pharmacy in 1877 For a time he was in the employ of Wm H Brown & Bros in Baltimore and then joined the firm of Powers & Whiteman as traveling representative When this firm merged with Merck & Co he continued as representative He is survived by his widow and three sons Lewis W Robinson is southern representative of Merck & Co and Frank T District Sales Manager for the Monsanto Chemical Co

In the sketch of the April JOURNAL of the late Frank B Stephens it should have been stated that Mr Stephens was an alumnus of the Illinois College of Pharmacy, Class of 1887

The death of **Prof Herbert C Kassner,** of Columbia University College of Pharmacy, was announced May 17th a sketch of the deceased will appear in the June[1] issue of the JOURNAL His passing is a great loss to the ASSOCIATION and the institution which he served faithfully for a number of years and sympathy is expressed to the bereaved The writer asks pardon for referring here to an article by Mrs Kassner in 1931 on 'Pharmaceutical History Brought to Light by a Famous Misnamed Picture' and which had wide distribution, the picture adorns many pharmacies

Dr Jacob A Flexner, prominent as a physician and as a pharmacist died at the home of his son Dr M Flexner in Louisville, Ky April 13th aged 76 years He was an alumnus of Louisville College of Pharmacy and, later studied medicine becoming a leader in that profession

SOCIETIES AND COLLEGES

LIST OF REGISTRANTS ANNUAL MEETING, A PH A WASHINGTON, D C

Corrections and additions are respectfully requested, a number evidently failed to sign the official Registration Book the names are given as recorded Please address JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION, 2215 Constitution Ave, Washington D C

ACHESON W R MR AND MRS Cambridge Mass
ADAMO M E Boston Mass
ADAMS W D MR AND MRS Forney Texas
AMES HAZEL Medford Mass
ANDERSON W C MR AND MRS Brooklyn N Y
ANDREWS M J MR AND MRS Baltimore Md
ARNY H V New York City
AVERY CHARLES H Pasadena Calif

BACON F J MR AND MRS Cleveland Ohio
BAILEY MRS GEORGE Detroit Mich
BALDINGER LAWRENCE H South Bend Ind
BALLEW J C Lenoir N Car
BAROL ALFRED Philadelphia Pa
BAUER J C MR AND MRS Baltimore Md
BEAL GEO D MR AND MRS Pittsburgh Pa
BEAL JAMES H MR AND MRS Cocoa Florida
BEARD J G Chapel Hill N Car
BECKER I A Chicago Ill
BELL MRS JOHN G Washington D C
BERG F F Floral Park N Y
BERGY G A Morgantown W Va
BEST I M Malden Mass
BIBBINS F F MR AND MRS Indianapolis Ind

[1] Page 524 of this issue

Bird J C Philadelphia Pa
Bjornstad O A Mr and Mrs Spencer Iowa
Blackall George Bristol Conn
Bliss A R Memphis Tenn
Block A Brooklyn N Y
Blome W H Detroit Mich
Boas A Washington D C
Bohn Herbert Indianapolis Ind
Bosley J O Wilmington Ill
Bowen Mrs J L Chicago Ill
Bower S W Buffalo N Y
Bradley Theodore J Boston Mass
Brakke N N McVille N Dak
Brewer C M Mr and Mrs Oklahoma City Okla
Brewer S W Buffalo N Y
Britt F A Mr and Mrs Evansville Ind
Brown Henry Scranton Pa
Budinger Mrs Caroline W Williamsport Pa
Burdine A V Mr and Mrs Washington D C
Burlage H M Mr and Mrs Chapel Hill N Car
Burniac J J Detroit Mich
Burton J C Stroud Okla
Butler H M Washington D C
Butz Lewis Philadelphia Pa

Campbell G G Pittsburgh Pa
Campbell Wm B Mr and Mrs Washington D C
Canis O P M New Brunswick N J
Cannon C C Savannah Ga
Caspari C F St Louis Mo
Chagnon Wilfred Newton Mass
Chamberlain N J Cleveland Ohio
Christensen B V Gainesville Fla
Christensen H C Chicago Ill
Clark R W Madison Wis
Clayton Charles J Denver Colo
Cliffl W L Philadelphia Pa
Cole B Olive Baltimore Md
Collins C W Parkersburg W Va
Collins George W Chicago Ill
Coniglio Frank L Gainesville Fla
Cook L F Mr and Mrs Philadelphia Pa
Cook Roy B Charleston W Va
Cooper Zada M Iowa City Iowa
Costello P H Cooperstown N Dak
Cousins Walter Mr and Mrs Dallas Texas
Cox C L Newark N J
Criswell F M Washington D C
Crockett W G Richmond Va
Crosbie H H Cincinnati Ohio
Crouch R L Mr and Mrs Roanoke Va
Crowe R I Memphis Tenn
Currens T F Mr and Mrs New York City
Curry G L Louisville Ky

Dargavel J W Chicago Ill
Davidov Hyman Baltimore Md
Davidov Mrs O V Baltimore Md
Day W B Chicago Ill
Delgado F A Washington D C
Diermier G P Washington D C
Dille J M Washington D C
Dodge F D Bayonne N J
Downey W C Washington D C
Drain George W Newark N J
DuMez A G Mr and Mrs Baltimore Md
Dunning H A B Mr and Mrs Baltimore Md
Durham E E Mr and Mrs Corunna Mich
Dye C A Mr and Mrs Columbus Ohio
Dyer R E New York City

Eberle E G Mr and Mrs Washington D C
Eldred F R Jersey City N J
Ellicott Charles S Catonsville Md
Emanuel Louis Mr and Mrs Pittsburgh Pa
Engelking Mrs A G and Daughter Orange Grove Texas
Eppley J A Philadelphia Pa
Evans Charles H Warrenton Ga

Fabel L R Detroit Mich
Falconer H S Newport News Va
Faxon H D Kansas City Mo
Ferring Lawrence New Orleans La
Fischelis R P Mr and Mrs Trenton N J
Frailey Carson P Mr and Mrs Washington D C
Frailey Wm A Washington D C
Fraser S W New York City
Frbericks F H Cincinnati Ohio
Fuhrman C J Mr and Mrs Washington D C
Fulmer M H Gainesville Fla
Funk John A J Mr and Mrs Galveston Ind

Gabel L F Mr and Mrs Detroit Mich
Garloud F E Denver Colo
Gaw R R Pittsburgh Pa
Gayle J W Franklin Ky
Giffen R C Washington D C
Gilbert C T Mr and Mrs Norton Conn
Gill J J Providence R I
Gilson C F Centerdale R I
Glassford John Baltimore Md
Glover Wm H Mr and Mrs Lawrence Mass
Godding Mrs J G Boston Mass
Goldstein Morris G Washington D C
Gonzales Carlos G Ponce P R
Grant E V Baltimore Md
Gray Wm Chicago Ill
Green Antoine E Washington D C
Greenbaum F R Philadelphia Pa
Griffin L W Mr and Mrs Boston Mass
Griffith Ivor Philadelphia Pa
Gundling John L Washington D C
Gustafson Charles Jr Hartford Conn

Hancock F W Oxford N Car
Hancock James E Baltimore Md
Hankins W M Mr and Mrs Daytona Beach Fla
Hardie Wm Mr and Mrs Fall River Mass
Harrisson J W E Philadelphia Pa
Havenhill L D Mr and Mrs Lawrence Kans
Hawk Judson Atlanta Ga
Hawkins J L Huntington W Va
Hay E A Portland Me
Haymaker E B Clarksburg W Va
Hayman Alice Morgantown W Va
Hayman J L Mr and Mrs Morgantown W Va
Hein Elizabeth New York City
Hein H F Mr and Mrs San Antonio Texas
Helms Samuel T Baltimore Md
Henry Mrs S C Washington D C
Herbst Wm P Washington D C
Hilton S I Mr and Mrs Washington D C
Hitchens R M St Louis Mo
Hoge Ernest Wheeling W Va
Hogstad Anton Mr and Mrs St Louis Mo
Holton C W Mr and Mrs Essex Fells N J
Horst Hermann Stuttgart Ark
Hoskins Miss Virginia Baltimore Md
Hunt Wm H Baltimore Md
Husa W J Gainesville Fla
Hutchins Richard St Louis Mo

Ichniowski C T Baltimore Md
Ireland F J Madison Wis
Irizarry R L P R

Jacobs Fred A Toronto Canada
Jacobs M L Chapel Hill N Car
Jelinek J P St Paul Minn
Jenkins Glenn L Baltimore Md
Johnson Henry S New Haven Conn
Johnson L V St Michaels Md
Jones Rowland Gettysburg S Dak
Jongeward M Fargo N Dak
Jordan C B Mr and Mrs Lafayette Ind

Kahler Louis Mr and Mrs Baltimore Md
Kantner L M Mr and Mrs Baltimore Md
Kantrowitz Hugo Richmond Hill N Y
Kebler L F Mr and Mrs Washington D C
Kelly E F Mr and Mrs Washington D C
Kelly Frank P Mr and Mrs Carbondale Pa
Kelly Frank P Jr Carbondale Pa
Kelly Kathleen Washington D C
Kendig H E Chestnut Hill Philadelphia Pa
Kirby F B Evanston Ill
Koch J A Mr and Mrs Pittsburgh Pa
Krantz J C Jr Mr and Mrs Baltimore Md
Kremers Edward Madison Wis
Kremes A I Philadelphia Pa
Krumwiede H A Mr and Mrs New Brunswick N J
Krusen William Philadelphia Pa

Lakey R T Detroit Mich
Lampa R R Mr and Mrs Tenneck N J
Lanwermeyer C F Waukegan Ill
Lascoff J L New York City
LaWall C H Mr and Mrs Philadelphia Pa
Lee J W Washington D C
Leeper Mrs Augusta Washington D C
Leigh T R Gainesville Fla
Lemon A B Buffalo N Y
Leonard C S Tuckahoe N Y
Lewis H B Ann Arbor Mich

LITTLE ERNEST MR AND MRS Highland N J
LLOYD J T MR AND MRS Cincinnati Ohio
LLOYD OLITA Cincinnati Ohio
LOFGREN F V Valparaiso Ind
LOVELAND P R Atlantic City N J
LOVIS H C South Orange N J
LUDWIG ANDREW F Baltimore Md
LUKENS F J Clarendon Va
LYMAN R A Lincoln Nebr

MCCARTNEY F L MR AND MRS Chicago Ill
MCCLOSKEY J F New Orleans La
MCCULLOUGH FRANK V New Albany Ind
MACHT D I Baltimore Md
MALAKOFF M S New York City
MANSON A P MR AND MRS Gardiner Me
MARQUIER A F South Orange N J
MARR LEON H MR AND MRS Farmington Me
MAXWELL D L Washington D C
MEADS W F Des Moines Iowa
MEISSNER F W MR AND MRS La Porte Ind
MENENDEZ JOSÉ Rio Piedras P R
MERRELL C G Cincinnati Ohio
MICKELSEN A O Portland Ohio
MILNE F A Pratt Kansas
MITCHELL J S Washington D C
MOORE DORIS R Ada Ohio
MOOSE W LEE Albermarle N Car
MOSKEY T A MR AND MRS Washington D C
MOSSOP MISS CARRIE Baltimore Md
MOTLEY E T Columbia S Car
MUESING WM C New Ulm Minn
MUIR I H Farmington Me
MULDOON H C Pittsburgh Pa
MULFORD H K Philadelphia Pa
MULLIGAN PAT Topeka Kans
MUNCH JAMES C MR AND MRS Philadelphia Pa
MURDOCK BURTON MR AND MRS Kennebunk Me

NEVIN THOMAS New York City
NEWCOMB E I MR AND MRS Montclair N J
NEWTON H C Omaha Nebr
NICHOLS A B Philadelphia Pa
NICOLAI NATHANIEL Baltimore Md
NILES EDWARD H Indianapolis Ind
NITARDY F W Brooklyn N Y

O CONNELL C LEONARD Pittsburgh Pa
OESTER Y T Notre Dame Ind
OSOL ARTHUR Philadelphia Pa

PACKARD C H MR AND MRS Boston Mass
PARADOWSKY JOE Kansas City Kans
PARKER H W Jonesboro Ark
PEACOCK J C MR AND MRS Philadelphia Pa
PHILIP W B MR AND MRS Washington D C
PHILLIPS MRS SHINE Big Springs Texas
PIERCE CHARLES S MR AND MRS Springvale Me
PILCHARD J B Harrisburg Pa
PITTENGER P S Philadelphia Pa
PLAXCO J M Due West S Car
POWELL LESTER MR AND MRS Falls Church Va

QUIMBY M W MR AND MRS Ithaca N Y

RAABE R H MR AND MRS Ada Ohio
RAABE MISS RUTH Ada Ohio
REESE D J Philadelphia Pa
REESE J E Philadelphia Pa
REESE R C MR AND MRS Topeka Kans
REIF E C Pittsburgh Pa
RHODES GEORGE W Newark Del
RICHARDSON L N Bel Air Md
RIDER T H Cincinnati Ohio
RIEMENSCHNEIDER J H Chicago Ill
RIPPETOE J R New York City
RISING L W Newark N J
RIVARD W H MR AND MRS Providence R I
RODDIS I H Washington D C
RODMAN R W Bloomfield N J
ROEC L M Rahway N J
ROSE I W Chapel Hill N Car
ROSEN HARRY Washington D C
ROSIN JOSEPH Plainfield N J
ROTH H D Gainesville Fla
ROWE I W MR AND MRS Detroit Mich
RUDD W F MR AND MRS Richmond Va
RUDY H R MR AND MRS Hagerstown Md
RUNYON E W New York City
RUSSELL JASON Detroit Michigan
RUSSELL O F MR AND MRS Elkhart Ind

SAALBACH LOUIS Pittsburgh Pa
SAMPSON W I Newark N J
SAVANNAH CLAUDE C Savannah Ga
SAWYER J R MR AND MRS Boston Mass
SCHACTERLE G K MR AND MRS Philadelphia Pa
SCHAEFER F C A MR AND MRS New York City
SCHICKS G C Montclair N J
SCHLICHTING H E MR AND MRS Lansing Mich
SCHORTZOW R E Brooklyn N Y
SCHWARZ A J Memphis Tenn
SCHWARZWALDER S J MR AND MRS Columbus Ohio
SCOVILLE W L MR AND MRS Detroit Mich
SECORD C L Chicago Ill
SHANGRAW W B MR AND MRS Rutland Vt
SILSBY J N Cliffside N J
SISSON JOSEPH M Boston Mass
SLOCUM J W MR AND MRS Indianola Iowa
SMITH D H Washington D C
SMITH UPSHER St Paul Minn
SNOW CLYDE M MR AND MRS Chicago Ill
SNYDER J P MR AND MRS Norwich N Y
SONDERN C W MR AND MRS Cincinnati Ohio
SONNENBURG MISS AMELIA Baltimore Md
SPEASE EDWARD MR AND MRS Cleveland Ohio
STANBURY R B J Toronto Canada
STOCKING C H Ann Arbor Mich
STOUT E P Detroit Mich
STURGEON W J MR AND MRS Kittanning Pa
SUTER A I Washington D C
SWANSON L E Indianapolis Ind
SWARINGEN D C China Grove N Car
SWENSON T L Seattle Wash

TAYLOR F O Detroit Mich
TEETERS WILBER J Iowa City
TENNYSON I A Washington D C
TERRY R E Chicago Ill
THOMAS MRS R J Dallas Texas
THOMPSON M R MR AND MRS Baltimore Md
TICE L F Philadelphia Pa

UTECH MRS P H Meadville Pa

VANDERKLEED CHARLES E Philadelphia Pa
VARS C A Westerly R I
VILAS FRED Pierre S Dak

WALES H Washington D C
WALTON L L MR AND MRS Williamsport Pa
WARREN L E Chevy Chase Md
WHEIPLEY MRS H M St Louis Mo
WHITLEY R S Chapel Hill N Car
WHITNEY H A K MR AND MRS Ann Arbor Mich
WHYTE H H Philadelphia Pa
WICKHAM E A Nutley N J
WILCOX W D Philadelphia Pa
WILLIAMS LAWRENCE S Baltimore Md
WILLIAMSON R E L Baltimore Md
WILSON R C MR AND MRS Atlanta Ga
WIMMER C P New York City
WINNE A L I Richmond Va
WOODWARD J S Phoebus Va
WRIGHT C F Boston Mass
WRIGHT T G Baltimore Md
WULLING F J Minneapolis Minn
WYNN FRANCES M Washington D C

YOUNG G O Buckhannon W Va
YOUNGKEN H W Boston Mass

ZIEFLE A MR AND MRS Corvallis Ore
ZOELLER E V Tarboro N Car

OFFICERS OF THE ILLINOIS PHARMACEUTICAL ASSOCIATION

The Illinois Pharmaceutical Association meeting in LaSalle, May 15th–17th was well attended It was decided to continue holding the state convention in May instead of June The following officers were elected *President* George V Haering Chicago *First Vice-President* H M Anderson Monmouth, *Second Vice President* L Brown Hamilton Galesburg *Third Vice President*, E J Merriman, Joliet *Treasurer* George Bennett Urbana, *Secretary* Wm B Day Chicago

JOINT MEETING, MARYLAND PHARMACEUTICAL ASSOCIATION AND DELAWARE PHARMACEUTICAL SOCIETY

A joint meeting of the Maryland Pharmaceutical Association and Delaware Pharmaceutical Society was held at Wilmington Among the papers discussed were The Prescription Department" by Frank L Black, Price Stabilization" by Robert W Rodman Considerable attention was paid to the latter subject

ARKANSAS DRUGGISTS ELECT SUCCESSOR TO EDGAR D OSLIN

At a joint meeting of the executive board of the Arkansas Pharmaceutical Association and the Arkansas State Board of Pharmacy on April 11th Ira Brite was elected secretary manager of the state association to fill the unexpired term of the late Edgar D Oslin, who died April 9th The 52nd Arkansas state convention will be held in Texarkana

NEBRASKA PHARMACEUTICAL ASSOCIATION

The 53rd annual convention of the Nebraska Pharmaceutical Association which closed May 9th at Omaha was well attended and much interest was shown in the discussions of every day problems Among the papers presented were Show Cards,' by Carl P Berrgren, Monte Powell represented the N A R D F S Bukey spoke on 'What Does It Cost to Produce a Cosmetic' Charles W Bauer discussed Food and Drug Laws and the Copeland-Tugwell Bill,' J E Griffin spoke on Helping the Doctor Help His Patients,' George W O'Malley discussed The Sales Tax," and M T Williamson 'The Retail Drug Code"

It was decided to hold the next annual convention in Lincoln during February while the Legislature is in session

The following officers were elected *President* Guy Butler, Lincoln, *First to Fifth Vice-Presidents*, H L Bellamy, Cambridge, T J Ryan Omaha C S Lincoln Lincoln, A O Gordon Merna, C H Saults Gordon Orel Jones, Oconto was elected *Treasurer* and J G McBride Lincoln, *Secretary*

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The ninety-fourth meeting of the American Association for the Advancement of Science will be held in Berkeley, Calif, from June 18 to 23, 1934 This will be the fourth summer meeting of the association on the Pacific Coast previous meetings having been held at San Francisco in 1915, at Portland Ore in 1925 and at Pasadena in 1931 All these have been joint meetings with the Pacific Division This year the University of California and the Pacific Division of the association are co operating as hosts Sessions will be held for the most part in lecture halls of the University of California on the campus at Berkeley

COPELAND BILL DEBATED

The Food and Drugs bill by Senator Copeland was taken up in the Senate on May 16th and considered for about an hour and deferred to make way for legislation urgently desired by the Administration Senator Copeland said that he would use every honorable means to secure passage of the bill at this session The President is understood to favor the principle of the bill

NEW JERSEY CODE

Governor Harry Moore of New Jersey, signed the State code for retail druggists, which provides for a mark up of 15 per cent over the manufacturers wholesale list price to retailers or wholesalers in dozen lots or less The code will operate under a 60 day trial

The Governor addressed the final hearing on the code and urged retailers to cooperate in making the code effective President R P Fischelis contributed largely to the success by presenting statistical information in support of the code

PACKAGE MEDICINE CODE IS APPROVED

The Trade Practice Provisions of the Code of Package Medicine Manufacturers provides

Section 1 (*a*) A member of the industry shall sell his products commodities or articles to primary distributors on an open price basis that is fair to all with the same allowances terms and prices as to products, quantities or trade classifications

(*b*) The term "open prices,' as used in this section means a price list which is published by each member of the industry for the equal information of all primary distributors in the separate or the several classes of primary distributors and which state all the prevailing terms of sale for the separate or the several classes of primary distributors

(*c*) Compensation paid to a primary distributor by a member of the industry for co operative advertising, counter displays, window displays, salesmen's efforts or any other special sales activities shall be uniform according to kind and scope of services rendered, and not on a basis of discounts on quantity purchases

(*d*) Each member of the industry or his agent shall file his current price list with the code authority within thirty days after the approval of this code Each member of the industry shall file (by registered mail) any subsequent revisions of such price list with said code authority

(*e*) This section shall not apply to the sale of private brand products on contract by a manufacturer to the owner of such private brand, nor to the sale of products for export, nor to bids submitted to governmental units

Section 2 No member of the industry shall use advertising whether printed, radio display or of any other nature, which is inaccurate in any material particular or misrepresents merchandise (including its use, trade mark, grade quantity size origin material, content, preparation, credit terms values, policies or services) and no member of the industry shall use advertising and/or selling methods concerning curative or therapeutic effects which are false and fraudulent

Section 3 No member of the industry shall use advertising which refers inaccurately in any material particular to any competitor or his merchandise prices values, credit terms, policies or service

Section 4 No member of the industry shall give permit to be given or directly offer to give, anything of value for the purpose of influencing or rewarding the action of any employee agent or representative of an other in relation to the business of the employer of such employee the principal of such agent or the represented party without the knowledge of such employer principal or party This rule shall not be construed to prohibit the free and general distribution of articles commonly used for advertising except so far as such articles are actually used for commercial bribery as hereinabove defined

Section 5 The re packaging or transferring of any article from the container of the member of the industry into another container, and the offering of such re packaged item for sale with intent or capacity to deceive the purchaser is an unfair trade practice

Section 6 The unauthorized use of a copy, counterfeit or colorable imitation of the trade mark, label or identifying name or device of the product of another corporation, association firm or person which has the tendency and capacity to mislead purchasers or prospective purchasers is an unfair trade practice

Section 7 No member of the industry shall secretly offer or make any payment or allowance of a rebate refund commission credit unearned discount or excess allowance, whether in the form of money or otherwise for the purpose of influencing a sale nor shall a member secretly extend to any customer any special service or privilege not extended to all customers of the same class

SMUGGLING NARCOTICS INTO PRISON

Four defendants were convicted and two, Dewey C Doss and Joseph H Miro, were acquitted March 30th, on charges of conspiring to smuggle narcotics into the Atlanta Federal Penitentiary

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

The annual meeting of the American Pharmaceutical Manufacturers' Association will be held in Chatham on Cape Cod, during the week of June 25th The headquarters hotel is the Chatham Bars Inn

CHARLES RICE

A former U S P chairman

MERGER OF ALCOHOL AND REVENUE BUREAUS

The Bureau of Industrial Alcohol and the Bureau of Internal Revenue were merged May 10th The old alcohol bureau becomes the Alcohol Tax Unit of the Bureau of Internal Revenue, together with a large part of the alcoholic beverage unit of the Department of Justice

The unit will be headed by Arthur J Mellott as Deputy Commissioner of Internal Revenue, but until passage of the deficiency appropriation bill providing funds for this office Mr Mellott will serve as a special assistant to the Commissioner of Internal Revenue He will have two assistants, one in charge of permit work and the other in charge of enforcement The former has not yet been chosen, but the latter post has been filled by Capt William R Sayles U S N D S Bliss, who has been Commissioner of Industrial Alcohol during the past five months returns to his former position as Acting Deputy of Internal Revenue in charge of the miscellaneous tax unit

Commenting on the transfer the Secretary of the Treasury Henry Morganthau, Jr, declared that for the present, the existing regulations and machinery for control of nonbeverage alcohol would remain unchanged but that changes might be made later if there appeared to be loopholes for tax evasion The personnel of the alcohol control organization will remain the same From a report of the *Paint Oil and Drug Reporter*

PHARMACISTS AT THE TOMB OF THE UNKNOWN SOLDIER

Members of the AMERICAN PHARMACEUTICAL ASSOCIATION and ladies visited the Tomb of the Unknown Soldier during the recent convention Former president L L Walton, as representative, spoke in part as follows Representing President R P Fischelis and the members of the AMERICAN PHARMACEUTICAL ASSOCIATION, I have the honor of placing this wreath upon the tomb of one, an unknown soldier, who gave his life in the struggle of this nation to help make the world safe for democracy May his be the reward of the righteous and of all who give their lives for the benefit of their fellowmen

HERBERT CARL KASSNER

Dr Herbert Carl Kassner Associate Professor of Chemistry at the College of Pharmacy of Columbia University, died on Thursday, May 17, 1934, at his home, 22 Carlton Terrace, Stewart Manor, N Y He had been ill with pneumonia for two weeks

Dr Kassner was born in Jamaica, Queens on March 6, 1899 He received his early education in the public schools of Queens graduating from the Jamaica High School in January 1917 In the fall of the same year he entered the College of Pharmacy of Columbia University, receiving the degree of Pharmaceutical Chemist in the spring of 1920 In the spring of 1921 he was granted the degree of Bachelor of Science in Pharmacy and awarded the Plaut Fellowship, which provided for study at a foreign university or college Dr Kassner elected the University of London for his graduate work and in 1924 was awarded the degree of Doctor of Philosophy by that University, offering as his dissertation in partial fulfilment of the requirements for that degree a report on the histological study of the seeds of *Ipomœa hederacea* and other species of *Ipomœa*

Upon his return to the United States Dr Kassner was employed as research chemist with Messrs E R Squibb and Sons Later he was called to the Albany College of Pharmacy, serving for three years first as Assistant Professor and then as Associate Professor in Chemistry In July 1927 he became Associate Professor of Chemistry at the College of Pharmacy of Columbia University in which capacity he served until his death

Dr Kassner was one of the scientific editors of *The American Druggist* and a frequent contributor to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION He was a member of the AMERICAN PHARMACEUTICAL ASSOCIATION, the American Chemical Society and a corresponding member of the British Pharmaceutical Conference He served for several years as secretary of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION

Dr Kassner is survived by his widow the former Elsie Woodward, his parents Mr and Mrs Arno C Kassner of Jamaica, a brother Arno W C Kassner of Jamaica and a sister, Mrs Mildred K Joseph of St Albans, Queens

Recent photograph of the American Institute of Pharmacy

C T GILBERT

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII JUNE, 1934 No 6

C THURSTON GILBERT

C Thurston Gilbert, the retiring president of the National Association of Boards of Pharmacy, was born in Danbury, Conn , June 6, 1892 He received his early education in the public schools and after completing the high school course in his home city he engaged as apprentice in the Barnum Pharmacy of Danbury

In 1910 he matriculated at the Philadelphia College of Pharmacy and Science and graduated from that institution in 1913, earning the P D degree and was awarded the AMERICAN PHARMACEUTICAL ASSOCIATION membership prize offered by Dean LaWall, for high average in examinations during the course After graduation he was employed for a time in pharmacies of Ocean City and Atlantic City, N J He served in Base Hospital No 43 at Fort McPherson, Ga , and in a pharmacy of Atlanta, Ga

Returning to his former home in Connecticut he was appointed postmaster at Noroton Heights and in January of 1918 he purchased a Noroton pharmacy In 1925, Mr Gilbert was appointed a Commissioner of Pharmacy and received re-appointment in 1930, he has been president of the Connecticut Board and vice-president and chairman of District No 1, National Association Boards of Pharmacy He was delegate to the Pharmacopœial Convention of 1930 and is serving his second term as president of the Southwestern Druggists' Association of Connecticut His address as president of the National Association Boards of Pharmacy is printed in the May issue of the JOURNAL, page 457

In 1917 Mr Gilbert married Miss Maud Alice Porter of Atlanta, Ga They have one daughter

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

SYMBOL OF A TREND

THE *Washington Evening Star* of May 2nd, presented an editorial under above caption, of which the first paragraph is quoted

'The beautiful new home of the AMERICAN PHARMACEUTICAL ASSOCIATION Constitution Avenue at Twenty-Second Street, has a significance exceeding even the important scientific purposes to which it will be dedicated It represents a tide which is working in the affairs of men It is a symbol of a trend "

The *Star* indicates the message in the last paragraph of the same editorial

"The city founded by the Father of His Country and proud to bear his name, it seems clearly indicated is destined to be the Athens of the Western World, the heart of Western Civilization The trend is manifest "

Many applications can be made of the thought on pharmaceutical trends Probably, never in the history of the AMERICAN PHARMACEUTICAL ASSOCIATION was there such evidence of strong desire to firmly establish professional pharmacy so that it may serve fully its purpose in rendering public health service, to work cooperatively with the professions engaged in the interest of public health The aims and purposes of the American Institute of Health, so ably expressed by Chairman H A B Dunning, evidence the strong desire and determination to move pharmacy upward and forward

President R L Swain in his closing dedicatory remarks, retrospects and looks forward in the closing words

"As we become aware of the vastness of this project, as our hearts begin to beat in harmony with its great ideals, as we catch a glimpse of the immensity of the principles for which it stands, let us, too, become dedicated to the great tasks remaining before us Let us resolve that this edifice shall really be our image Let us be determined to be worthy of it May we never foreget that the American Institute of Pharmacy is dedicated to those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy "

Chairman P H Costello said in substance that we must be guided by past experience in order to make it possible for us to render a greater service in the future

There are differences of opinion relative to the codes, opposite views, and there are evidences that these sometimes find expression in prejudiced opinions Few, if any, comprehend the full significance of the new deal, in some cases it can be shown that it is detrimental and has not improved conditions President R L Swain said in his annual address that "the NRA program, the whole code effort, as imperfect and contradictory as it undoubtedly is, is simply the first manifestation of forces seriously devoted to the task of creating a new economic system which will be more responsive to the social impulse Much of what is being done is highly controversial "

A view relative to the trend is referred to by him in these words

"I am certain that in due course, and time must be given to working out any fundamental concept, the general principles recognized in the codes will be shown to be advantageous to all branches of industry and society"

President L D Havenhill may have pointed to a trend in pharmaceutical education when he closed his address in saying that the modern intellectual development of any young man or woman falls quite naturally into two main divisions *first*, a non-technical, non-professional, so-called cultural part, and *second*, a technical or purely professional part After discussing the subject he concludes that "a program of this sort is in line with practices in other professions, and the sooner we enter their company and adopt their point of view the sooner we shall enter into our professional birthright and take our proper place with the professions of medicine and dentistry in helping solve the great problems of health and disease which are so very fundamental and important to our age in civilization"

We are not so much encouraged by conditions as they exist as by the trend toward developing opportunities and the evidence of greater interest in professional pharmacy

THE PROPOSED NATIONAL PHARMACY COUNCIL

"Let Us Raise a Standard to Which the Wise and Honest Can Repair The Event Is in the Hands of God"*

IN the proceedings of the Washington meeting, printed in this issue of the JOURNAL, will be found the outline of a suggestion made at the Second General Session of the ASSOCIATION, when an invitation was given to present new plans for the American Institute of Pharmacy In response to this proposal there seemed to be a feeling that it presented a great opportunity for American Pharmacy

A study of the tentative plan reveals that registration becomes a voluntary step, open to every trained pharmacist Registration will insure an immediate recognition for high professional standing This is the encouragement and support for which hundreds of pharmacists, who have remained true to the ideals and the standards of the profession, have been waiting

While the standards for pharmaceutical service must be established and maintained at a high plane of efficiency, nothing that seems impossible or impracticable is proposed The details, so far as tentatively drafted, embody only those features which most pharmacists are now claiming as their right and as their present objective—a properly trained pharmacist in charge, adequate medical stocks satisfactorily maintained, a suitable professional and a true professional and ethical policy is the entire story But its compliance must be real

The cost would not be prohibitive No matter how small or how large the organization the establishment of such a professional department would be possible Being truly professional, however, in its basic principles it would of necessity be established only upon the personal integrity of the pharmacist in charge so that the standing and registration of a pharmacy would have to be based upon the application of an individual It is for American pharmacy to study this opportunity

"After a general consideration by the Council the Chairman of the Council was authorized to appoint a special committee to consider the proposal and, later, to report to the Council" The committee appointed is composed of the following members E N Gathercoal, Robert L Swain, H V Arny, Edward Spease, Rober R Gaw, C F Kelly, R P Fischelis, C B Jordan and C Fullerton Cook *Chairman*

* George Washington Constitution Convention—1787

SCIENTIFIC SECTION

THE PREPARATION AND GERMICIDAL PROPERTIES OF SOME ALKYL DERIVATIVES OF HYDROXY DIPHENYLS *

BY S E HARRIS AND W G CHRISTIANSEN

The effect of an alkyl side chain on the bactericidal properties of phenols and other compounds has been the subject of several studies in recent years (1) It appears to be definitely established that the effect of a normal alkyl side chain is to augment greatly the bactericidal value of a phenol The typhoid activity increases with the size of the alkyl group until a maximum is reached beyond which further increase in the size of the alkyl group results in progressively lowered activity, a maximum has not been found in tests on staphylococcus aureus, *i e*, each increase in the size of the alkyl group has been accompanied by a greater activity

The present study covers the preparation and evaluation of a number of alkylated mono- and dihydroxy diphenyls It was expected that the alkyl groups producing the greatest activity would be smaller than the groups present in the most active alkyl phenols, cresols and resorcinols, due to the presence of the additional phenyl nucleus, and it was thought probable that the *n*-propyl side chain would be most effective This expectation was confirmed in the case of the 5-*n*-alkyl 2 hydroxy diphenyls, thus, the *staphylococcus aureus* activity of 2-hydroxy diphenyl is much greater than that of any other member of the series For the germicidal tests the compounds were dissolved in a solvent consisting of alcohol (25 cc), glycerin (35 cc) and water (*q s* 100 cc),[1] unless otherwise stated, the initial solution contained 0 25% of germicide These solutions were diluted with water as necessary immediately prior to test The results of these tests are contained in the following table

TABLE I

	Dilution at Which Bacteria Are Killed in 5 Minutes	
	Typhoid	Staphylococcus
A 5 *n*-Alkyl 2-Hydroxy Diphenyls		
2 hydroxy diphenyl	1–2000	1–800
5 ethyl 2-hydroxy diphenyl	1600	4000
5 *n* propyl 2 hydroxy diphenyl	400 400	12000 20000
5 *n* butyl 2 hydroxy diphenyl	400	2000
5 *n* amyl 2-hydroxy diphenyl	400	1200
B 3 *n*-Alkyl 2-Hydroxy Diphenyls		
2-hydroxy diphenyl	1–2000	1–800
3 *n* propyl 2 hydroxy diphenyl	400	400
3 *n*-butyl 2 hydroxy diphenyl	400	400
3 *n* amyl 2 hydroxy diphenyl	400	400

* Scientific Section A PH A, Madison meeting 1933

[1] This liquid is not in itself germicidal

C Alkyl 3 Hydroxy Diphenyls		
3 hydroxy diphenyl	1–800	1–4000
4 *n* propyl 3 hydroxy diphenyl*	1000	3000
6 *n* propyl 3 hydroxy diphenyl*	1000	<1000
D Alkyl Dihydroxy Diphenyls		
2,5 dihydroxy diphenyl[1]	1–500	1–500
4 *n* propyl 2,5 dihydroxy diphenyl*	<1000	10000
3 4 dihydroxy diphenyl	2000	1200
5 *n* propyl 3,4-dihydroxy diphenyl[2]	2000	4000

* Initial concentration 1–1000

[1] Initial concentration 1–250

[2] Initial concentration 1–2000

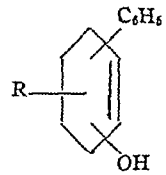
These results show

(*a*) Alkylation of 2-hydroxy diphenyl in the 3- or 5-position decreases the typhoid activity

(*b*) Alkylation of 2-hydroxy diphenyl in the 3-position decreases the *staphylococcus aureus* activity whereas alkylation in the 5-position increases it

(*c*) In the 5-alkyl 2-hydroxy diphenyl series the maximum staphylococcus activity is obtained with the *n*-propyl compound

(*d*) Propylation of 3-hydroxy diphenyl has little effect on the typhoid activity but decreases the staphylococcus activity The 6-*n*-propyl 3-hydroxy diphenyl in which the propyl group is para to the hydroxyl group is definitely less active than the 4-*n*-propyl isomer in which the alkyl and hydroxyl groups are ortho to each other This result is the opposite of that found in the 2-hydroxy diphenyl series, in the latter the compound containing the propyl group para to the hydroxyl group is definitely more active than the ortho isomer The activity of an alkyl hydroxy diphenyl is therefore dependent upon the relative positions of the alkyl, hydroxyl and phenyl nuclei



(*e*) Propylation of 2,5- and 3,4-dihydroxy diphenyls has little effect on the typhoid activity but does increase the staphylococcus activity

The initial concentration of the germicide in the alcohol glycerin water solution affects the results of the germicidal test at least in the case of 5-*n*-propyl 2-hydroxy diphenyl (Table II)

TABLE II

Initial Concentration of 5 *n* Propyl 2 Hydroxy Diphenyl	Dilution at Which Bacteria Are Killed in 5 Minutes Typhoid	Staphylococcus
0 25%	1–400	1–12000
	1–400	1–20000
0 10%	1–1000	1–30000
	1–1000	1–20000

The solubility of propylhydroxy diphenyl in water is low and the difference between the germicidal results obtained with 0 25% and 0 1% solutions may be due

to the fact that the larger ratio of alcohol to germicide in the latter case permits greater dilution without throwing the germicide out of true solution Thus, when 25% alcohol solutions containing 0 25 and 0 1% germicide are diluted so that the concentration of germicide is 1–30,000 (0 0033%) the alcohol concentrations would be 0 33% (with the 0 25% solution) and 0 83% (with the 0 1% solution) The results given in Table I were obtained mainly with 0 25% solutions, a similar series of tests made with 0 1% solutions might give higher activities for some of the compounds These additional tests would make the work more complete but it is doubtful whether they would alter the conclusions drawn from the data now available

The presence of sodium hydroxide affects the activity of these phenols, Table III contains a comparison of the results obtained in the absence and presence of alkali The alkaline solutions contained 0 25% germicide, 10–30% alcohol[1] and sufficient NaOH to yield a clear solution, this varied from 3 8 to 4 6 moles

TABLE III

	Dilution at Which Bacteria Are Killed in 5 Minutes			
	Without NaOH		With NaOH in Original Solution	
	Typhoid	Staphylococcus	Typhoid	Staphylococcus
2 hydroxy diphenyl	1–2000	1–800	1–2000	1–400
5 ethyl 2 hydroxy diphenyl	1–1600	1–4000	1–2800	<1–400
5 *n* propyl 2 hydroxy diphenyl	1–400	1–12000	1–2800	<1–400
5 *n* butyl 2 hydroxy diphenyl	1–400	1–2000	1–2000	1–10000
5 *n* amyl 2 hydroxy diphenyl	1–400	1–1200	1–400	1–2000

The addition of alkali

(*a*) Decreases the staphylococcus activity of the lower members of the series
(*b*) Increases the staphylococcus activity of the high members of the series
(*c*) Increases the typhoid activity of the lower members of the series
(*d*) Does not increase the typhoid activity of the highest member of the series

Although these phenolic substances are more readily soluble as the sodium salts, at high dilution these salts frequently hydrolyze to such an extent that the free phenol may begin to crystallize out Then, too, it is probable that the acidic nature of the phenol diminishes as the size of the alkyl group increases, for it is known that introduction of certain groups into phenols may depress the acidity to such an extent that the compound will not form salts, and becomes insoluble in aqueous alkali

Thus it is conceivable that the Gm -negative typhoid bacillus is attacked more readily by the sodium salt of the phenol, and that increased action ceases when the substituted phenol is not materially converted to the salt In similar manner the Gm -positive organism staphylococcus appears to be much less vigorously attacked by the sodium salt than by the free phenol The reversal of relative activity here occurs earlier in the series of progressively heavier substituents, and is much more pronounced

EXPERIMENTAL

During the early part of the study the 5 alkyl derivatives were synthesized by condensing the appropriate acid chloride or anhydride with 2 methoxy diphenyl by the Friedel and Craft

[1] Ten per cent in the cases of the ethyl and propyl compounds, 20% in that of the butyl and 30% in that of the amyl

method The resulting ketones were reduced by the method of Clemmenson and subsequently demethylated Considerable losses were experienced during the demethylation and this led to the adoption of an alternative method with notably smoother results This consisted of rearrangement of fatty acid esters of 2 hydroxy diphenyl by means of aluminum chloride to a mixture of 3- and 5 acyl 2 hydroxy diphenyls These ketones were separated and reduced to the corresponding alkyl compounds as before no demethylation being required

The esters were prepared by the action of the fatty acid on 2-hydroxy diphenyl in the presence of $POCl_3$ at 135° C Excellent yields were obtained of viscous colorless liquids which we were not able to obtain in crystalline form, an exception to this was the acetate which was obtained as white needles from dilute alcohol, m p 64° C In spite of repeated fractionation or cooling to low temperatures, no other ester would crystallize

The rearrangement of the esters was accomplished by heating to 160° C with anhydrous aluminum chloride for half an hour This gave the aluminum chloride compound of the mixed ketones in the form of a hard glassy mass which was decomposed in the usual way with dilute HCl The separation was conveniently brought about by extracting the mixture with petroleum ether in which the 3 acyl compounds were readily soluble The insoluble 5 acyl compounds which gave no red color with $FeCl_3$ were filtered off and recrystallized from a mixture of ether or benzol and petroleum ether The 3 acyl compounds were obtained by evaporating the solvent and distilling the residue These gave a deep red color with $FeCl_3$

It was observed that the length of the side chain had a marked effect on the products of rearrangement, the 5 acyl compound being the predominant product with shorter chains and a larger proportion of the 3 acyl compound being obtained when the *n* butyric and *n* valeric esters were rearranged

In spite of carefully standardized conditions, very variable yields of the alkyl derivatives were obtained on reducing these ketones The lost material was always encountered as a resin-like distillation residue from which all attempts to isolate crystalline products failed It is conceivable that these compounds are condensation products of the pinacone type A single detailed example of each typical reaction is given

2 HYDROXY DIPHENYL PROPIONATE (2 PHENYL-PHENYLPROPIONATE)

One mol of 2 hydroxy diphenyl was dissolved in one mol of propionic acid and the mixture heated to 135° C under reflux with mechanical agitation 0 5 mol $POCl_3$(or PCl_3) was then added slowly and the mixture maintained at 135° C till HCl was no longer evolved The ester was then decanted from the phosphorous acid, washed with water and dissolved in ether After being dried over $CaCl_2$, the ether was evaporated and the residue distilled, b p , 151–152° C at 4 mm Yield, 90%

REARRANGEMENT OF 2 HYDROXY DIPHENYL PROPIONATE

1 1 mols of powdered anhydrous aluminum chloride were added in small portions to one mol of 2 hydroxy diphenyl propionate Considerable heat developed and HCl was evolved The mixture was then heated in an oil bath at 160° C for 30–45 minutes The glassy reaction product was cooled, powdered and decomposed by adding gradually to well stirred 5% HCl The decomposition was completed by warming on the steam bath for a short time The mixture of 3- and 5 propionyl 2 hydroxy diphenyl was filtered off washed with dilute HCl and water and dried The dried product was extracted with a large volume of boiling petroleum ether b p 40–60° C and the undissolved 5 propionyl 2 hydroxy diphenyl filtered off After recrystallization from a mixture of ether and petroleum ether, 5 propionyl 2 hydroxy diphenyl was obtained as a white powder m p 151–152° C (2)

The petroleum ether extract was evaporated and the residue distilled yielding 3 propionyl 2 hydroxy diphenyl, b p 183–185° C /3 5 mm

5 *n* PROPYL 2 HYDROXY DIPHENYL

One part by weight of 5 propionyl 2 hydroxy diphenyl was refluxed during 10–12 hours with 4 parts amalgamated mossy zinc and 15 parts 20% HCl Brisk mechanical agitation during the reduction greatly reduced the time necessary for complete reduction The oily product formed was separated from the acid liquor and washed with hot water After drying with anhydrous

Na_2SO_4 in ether solution the ether was removed and the residue distilled, b p 171–172° C /9 mm, yield, 90%

TABLE IV

2 Hydroxy Diphenyl Derivatives	B P or M P	Yield %	Found C	Found H	Calculated C	Calculated H
Propionate	151–152°/4	85–90	79 6	6 32	79 6	6 2
n butyrate	154/3 5	90	80 5	6 7	80 0	6 7
n valerate	162–167°/4	80	80 8	7 2	80 3	7 1
3 propionyl	183–185/3 5	8	79 7	6 3	79 6	6 2
5 propionyl	M p 151–152	*				
3 *n* butyryl	185–190/3 5	15	80 0	6 7	80 0	6 7
5 *n* butyryl	M p 116–117	40	79 3	6 7	80 0	6 7
3 *n* valeryl	200–210°/5	20	79 8	6 34	80 3	7 09
5 *n* valeryl	M p , 104	40	79 8	7 13	80 3	7 09
5 ethyl	152/5	10[1]	84 6	7 2	84 8	7 10
3 *n* propyl	155–160/8	90	84 7	7 46	84 9	7 oo
5 *n* propyl	171–172/9	90	84 5	7 9	84 9	7 5o
3 *n* butyl	160–167/4	50	84 6	7 93	84 9	7 96
5 *n* butyl	173–175/6	75	84 4	8 08	84 9	7 96
3 *n* amyl	166–171/5	50	84 7	8 32	85 0	8 33
5 *n* amyl	181–183/6	65	85 5	8 41	85 0	8 33
2 Methoxy Diphenyl Derivatives						
5 acetyl	M p 90–90 5	46	79 8	6 31	79 7	6 2
5 propionyl	M p 93–94	50	79 3	6 54	80 0	6 7
5 *n* valeryl	202–204/4	40	80 1	7 45	80 6	7 1
5 ethyl	163–166/7	70	85 2	7 6	84 9	7 6
5 *n* propyl	171–172/9	90	85 5	7 9	85 0	8 0
5 *n* amyl	178–182/5	61	84 3	8 4	85 0	8 7
3 Hydroxy Diphenyl Derivatives						
Propionate	160–165/2	84 5	79 0	6 06	79 6	6 19
4 propionyl	M p 109	71 0	79 6	6 23	79 6	6 19
4 *n* propyl	162–3/3 M p 56–56 5	62 0	85 0	7 48	84 9	7 55
3 methoxy	140/5	90 0	85 0	6 45	84 8	6 52
6 propionyl 3 methoxy	M p 72	75 0	79 6	6 40	80 0	6 67
6 *n* propyl 3 methoxy	153–170/3	70 0	84 4	7 99	85 0	7 97
6 *n* propyl 3 hydroxy	M p 140–141	1 0	Mol wt in C_6H_6 calcd , 212		Found, 219	
Dihydroxy Diphenyl Derivatives						
3 4 dimethoxy	153/4 M p , 70	90	78 7	6 56	78 5	6 54
5 propionyl 3,4 dimethoxy	228–30/3 M p 113	10	75 0	7 16	75 6	6 67
5 *n* propyl 3 4 dimethoxy	195–210/7	90	80 1	7 61	79 7	7 81
5 *n* propyl 3 4 dihydroxy	Not determined	2	80 5	7 07	79 0	7 02
2 5 dimethoxy diphenyl	147–149/4	85	77 9	6 38	78 5	6 54
4 propionyl 2 5 dihydroxy	220–230/6 M p 138–139	15	74 5	6 07	74 4	5 78
4-*n* propyl 2,5 dihydroxy	195/9	90	78 7	7 38	79 0	7 02

* Reference (2)

[1] By demethylation of 2 methoxy 5 ethyl diphenyl

5 ACETYL 2 METHOXY DIPHENYL (3)

78 Gm (2 mols) 2 methoxy diphenyl were dissolved in 150 cc dry carbon disulphide and 112 Gm anhydrous aluminum chloride were added slowly with external cooling The mixture was well stirred and refluxed gently on the water bath while 31 Gm acetic anhydride (2 mols) were added during about one hour The refluxing and stirring was continued for a further period of one hour and the carbon disulphide distilled off The residue was decomposed with ice and HCl and the ketone extracted with ether The extract was washed with water, dilute NaOH and again with water, and then dried with $CaCl_2$ After distilling off the ether, the residue was distilled b p 194–204° C /6 mm The reddish distillate solidified on cooling and after recrystallization from petroleum ether had a melting point of 90–90 5° C , yield, 46%

ALKYL 3 HYDROXY DIPHENYLS

(*a*) *4 n Propyl 3 Hydroxy Diphenyl*—This was prepared by the rearrangement of 3 phenyl phenyl propionate and reductions of the resulting ketone as described under the preparation of 5 alkyl 2 hydroxy diphenyls The intermediate ketone gave a deep red color with ferric chloride solution and was therefore assumed to be the 4 acyl derivative The introduction of the acyl group into the 2 position is considered unlikely, owing to the steric hindrance of the phenyl group

(*b*) *6 n Propyl 3 Hydroxy Diphenyl*—Since the entire product of the ester rearrangement was the 4-acyl compound, the preparation of the 6 acyl 3 hydroxy diphenyl was necessarily carried out by the Friedel and Craft method on 3 methoxy diphenyl The reaction conditions for the acylation of 3 methoxy diphenyl were exactly those described under 5 acetyl 2 methoxy diphenyl and reference (3) The resulting ketone, which gave no color with ferric chloride was reduced in the manner previously described for 5 *n* propyl 2 hydroxy diphenyl

On attempting to demethylate the 6-*n* propyl 3 methoxy diphenyl by heating with hydriodic acid in glacial acetic acid much decomposition took place only a small quantity of the desired 3 hydroxy 6 *n* propyl diphenyl being obtained

DIHYDROXY DIPHENYL DERIVATIVES

The rearrangement of mono propionic esters of 3,4 dihydroxy diphenyl and 2,5 dihydroxy diphenyl gave tarry products from which no definite compounds could be isolated Direct introduction of acyl groups into the dimethyl ethers gave very poor yields, most of the ethers being recovered unchanged In the case of 3,4 dimethoxy diphenyl a 10% yield of 5 propionyl 3,4 dimethoxy diphenyl was obtained while in the case of 2 5-dimethoxy diphenyl demethylation took place at the same time, giving a 15% yield of 6 propionyl 2,5 dihydroxy diphenyl Various reaction-conditions were tried with little success The above results were obtained when the methods described in reference (3) were followed Both of the dihydroxy propionyl diphenyls gave a deep red color with $FeCl_3$

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E R Squibb & Sons and we gratefully acknowledge their assistance

SUMMARY

A number of 3-alkyl and 5 alkyl 2-hydroxy diphenyls and propyl derivatives of 3-hydroxy diphenyl and of two dihydroxy diphenyls have been prepared and tested for germicidal activity The 5-alkyl 2-hydroxy diphenyls were obtained by (*a*) the Friedel and Craft reaction on 2-methoxy diphenyl, and (*b*) rearrangement of the fatty acid ester of 2-hydroxy diphenyl The rearrangement method gave the 3 alkyl compounds as by-products

Bactericidal tests showed that the 3-alkyl compounds are comparatively inactive and that the 5-alkyl compounds have a markedly specific activity, the potency against *Staphylococcus aureus* being high compared with that against *B Typhosus* Of the 5-alkyl 2-hydroxy diphenyls, the 5-*n*-propyl was by far the most active

LITERATURE REFERENCES

(1) (*a*) Schaffer and Tilley, *J Bact*, 14 (1927), 259
(*b*) Johnson and Lane, *J A C S*, 43 (1921), 348
(*c*) Dohme, Cox and Miller, *Ibid*, 48 (1926), 1688
(*d*) Coulthard, Marshal and Pyman, *J Chem Soc* (1930), 280
(*e*) Klarmann, *J A C S*, 53 (1931), 3397
(*f*) Black, Stein and Walker, *J Chem Soc* (1931), 277
(2) Auers and Wittig, *J prakt Chem*, 108 (1924), 99
(3) "Organic Synthesis," Vol V, page 7, Wiley and Sons N Y 1925

RESEARCH DEPARTMENT OF THE CHEMICAL
AND PHARMACEUTICAL LABORATORIES,
E R SQUIBB AND SONS,
BROOKLYN, N Y

ISOMERIC NITRO-CRESOLS *

BY LEROY W CLEMENCE AND GEORGE W RAIZISS

In the preparation of a series of mercurials, it was necessary first to obtain the ten isomeric nitro-cresols Most of the research on these compounds is found in the earlier literature, very little having been done in recent years The methods vary and are in many cases indefinite and the results obtained by their use do not always lead to the conclusions described, either in yield or quality of the material

We believe that a condensed comparison of the known methods coupled with a reference to the preparation of each isomer in the best obtainable yields and purity would be of service to the organic chemist In those cases where we have improved the methods, a detailed description of the compound is given We present, moreover, methods which involve the least expense in starting material and complication in process

The nitro-cresols are prepared either by direct nitration of the cresol, resulting in single derivatives or mixtures, or by diazotization and subsequent replacement of the corresponding nitro-toluidine The nitro-toluidines are prepared by direct nitration of the toluidines In a few instances the nitro-cresols can also be prepared by simultaneous diazotization and nitration of the toluidines The 5-nitro 2 hydroxy-toluene is also prepared by oxidation of the 5-nitroso derivative

However, in the case of two isomers, the 6-nitro-2-hydroxy-toluene and 5 nitro-3-hydroxy-toluene, it is unavoidable to employ roundabout procedures inas much as the nitro group cannot be introduced, in the desired position, directly into the nucleus either of the cresol or the corresponding toluidine In fact, we have as yet been unsuccessful in isolating any definite quantity of the former according to the described methods, but we are still working on what may prove a successful attempt

DISCUSSION AND EXPERIMENTAL PART—NITRO ORTHO CRESOLS

3-Nitro-2-Hydroxy 1-Methyl-Benzene—This was prepared by Wohl (1) using a mixture of meta nitro toluene and powdered alkali, keeping the temperature below 40° C The material had to be mixed thoroughly for 24 hours and the unchanged nitro toluene, of which there was a considerable quantity, separated from the sodium salt of the nitro cresol

Noelting and Wild (2) diazotized ortho toluidine in dilute H_2SO_4 and after adding dilute HNO_3 heated the mixture until no further evolution of nitrogen took place The nitro-cresol was

* Scientific Section, A PH A, Madison meeting, 1933

separated by steam distillation Denınger (3) similarly used a large excess of sodium nitrite and omitted the nitric acid The yields in either case were poor

Nitration of *o*-cresol in presence of acetic acid was tried by Hofman and Miller (4), Rapp (5), Hirsch (6) and Gibson (7) In this way a better yield of the 3 nitro compound is obtained but it is contaminated with the 5 nitro and 3-5 dinitro compounds They can be separated by steam distillation The 5 nitro derivative is non volatile with steam We have observed that the 3 nitro-cresol distils over almost entirely, and after an interval is followed by the dinitro compound, which is also much lighter in color and a finer crystal than the mono nitro derivative

The method which gives the best yield of the 3-nitro-2-hydroxy methyl-benzene without much contamination of the di-nitro compound is that of Schultz (8), using benzene as a medium Although he also claims a large yield of the 5-nitro-2-hydroxy methyl benzene, we were able to obtain only about 5% of this compound However, by using a lower temperature (0° to 5°) we increased the yield of the 3-nitro isomer to 31%

4 Nitro 2-Hydroxy-1-Methyl-Benzene—This was first prepared by Noelting and Collin (9) by diazotization of the corresponding nitro toluidine in dilute H_2SO_4 and then allowing the mixture to stand, finally warming on a steam-bath to complete evolution of nitrogen The above authors obtained a good yield of a material which melted at 106–108° Later it was proven by Witt, Noelting and Grandmougin (10) that the above reaction does not take place entirely in the direction desired, but that a large amount of material shown to be 6 nitro indazole is also formed They and others (11) attempted to separate the nitro indazole by fractional crystallization and also by use of its insolubility in Na_2CO_3 solution This of course reduced the yield of the nitro-cresol

Ullman and Fitzenkam (12) devised a method which gave practically no nitro indazole and a good yield of nitro-cresol They added the diazo solutions slowly to boiling dilute sulphuric acid and separated the nitro-cresol on cooling We have obtained yields as high as 85% with this method

Ortho toluidine is dissolved in 10 volumes of concentrated H_2SO_4 and nitrated with an equivalent of concentrated HNO_3 at 0° C The mixture is poured into ice and water and the nitro toluidine sulphate is filtered off This is dissolved in water and Na_2CO_3 added until neutral and the 4-nitro 2 amino methyl benzene filtered off, washed and recrystallized from alcohol M p —107° Yield = 90%

40 Gm of this nitro toluidine are dissolved in 600 cc of 10% H_2SO_4, warming to dissolve On cooling to 0° some crystals of sulphate separate Add slowly, with good stirring, a solution of 18 Gm of sodium nitrite in 50 cc H_2O, keeping the temperature at 0° Stir for 15 minutes after all is added A clear solution is obtained Add this cold solution, over a period of 15 minutes to a boiling solution of 400 cc concentrated H_2SO_4 in 800 cc H O—a brisk evolution of nitrogen occurs Boil further for 10 minutes and cool thoroughly A brown oily material which forms on surface solidifies and crystals form in solution Filter and wash with cold water The crude material melts from 109° to 114° C It can be purified by solution in alcohol, treatment with 'nuchar" and precipitation with H_2O, or by solution in dilute NaOH, warming to 60° with small quantity of "nuchar," filtering and acidification with dilute hydrochloric acid Cool and filter off crystals Yield = 34 Gm (85%) Pale yellow needles, m p —118°

5 Nitro 2-Hydroxy-1-Methyl Benzene—As was previously shown (4), (5), (6), (7), this compound was formed simultaneously with the 3 nitro 2 hydroxy toluene but in small quantities, and was extracted from the tarry residue of the steam distillation only by long and tedious boiling with successive portions of water By diazotization of the corresponding nitro toluidine and replacement of the diazo group by hydroxyl or by boiling the nitro toluidine with strong aqueous alkali (13) better yields are obtained However, the above toluidine is difficultly separated from the corresponding 3 nitro derivative

Borsche and Birkhout (14) prepared a homogeneous product in good yields by the oxidation of 5-nitroso-2-hydroxy-toluene with potassium ferricyanide We have devised a method, using nitric acid as the oxidant, which gives a pure nitro

compound without any contamination of dinitro or 3-nitro isomer, in yields of about 80–85% This is a simpler and shorter method than the ferricyanide oxidation which involves several days' standing

35 Gm of solid sodium nitrite are added to a suspension of 27 Gm of *o* cresol in 2 liters of ice water with mechanical stirring A solution of 9 5 cc of concentrated sulphuric acid in 200 cc of H_2O is then added during the course of 1 hour, keeping temperature below 5° by further addition of ice Allow to stand for 2 hours in cold Filter off the nitroso compound, wash with ice water This crude material can be used for the further oxidation A small sample recrystallized from benzene melted at 136°

27 5 Gm of the crude nitroso compound are suspended in 200 cc of a mixture of 1 part of concentrated nitric acid and 3 parts of water This is agitated and cooled from time to time to prevent decomposition After three hours the solid material is filtered and washed with water It is purified by solution in 5% sodium hydroxide, treatment with charcoal and precipitation with dilute HCl (10%), which is added dropwise while cooling the alkaline solution It separates as pale brownish yellow needles M p —91° The yield is 25 Gm or about 82%

6-Nitro 2 Hydroxy 1 Methyl-Benzene —Since this isomer cannot be prepared by nitration of cresol, it must be obtained by the replacement of the diazo group from the corresponding toluidine Green and Lawson (15) claimed that this nitro toluidine was obtained simultaneously with the 4 nitro 2 amino toluene by nitrating ortho toluidine in sulphuric acid They maintained that by fractional crystallization of the hydrochlorides they separated the more difficultly soluble 6-nitro toluidine We were unable to obtain any of this material even when the conditions of the toluidine nitration were varied Cunerth (16), by nitration of toluene, obtained besides the 2-4-dinitro toluene an oily substance (2 6 dinitro toluene) which he reduced with ammonium sulphide and claimed to obtain the 6 nitro toluidine His yields, however, are not given and the quantities of the oily dinitro toluene obtained are so small that we could not obtain a sufficient quantity for further reduction Beilstein (17) Holleman (18) and Cohen (19) attempted to obtain the 2 6-dinitro toluene by reduction of the 2-4 6-trinitro toluene to 2 6 dinitro *p* toluidine and subsequent elimination of the amino group by diazotizing and decomposing in absolute alcohol

The trinitro toluene is expensive, and when we attempted to reduce it by the above methods the yields were very poor only a trace of the dinitro toluidine being formed Staedel (20) claims that in nitration of *o* phthalyl toluidide, two nitro derivatives are formed which on hydrolysis yield two corresponding nitro toluidines one of which is the 6 nitro 2 amino toluene We are working on this method and may obtain some measure of success

NITRO-META-CRESOLS

2-Nitro 3 Hydroxy 1-Methyl-Benzene —This material was originally considered an impurity which occurred with 4 nitro 3 hydroxy-toluene However, Khotinsky and Jacobson Jacobman (21) showed that in using *m* toluidine in Denninger's (3) and Noelting's (2) methods, when the mixture was steam distilled, another volatile product was carried over which did not crystallize in the distillate It remained oily and also was somewhat soluble in the aqueous portion of the distillate The latter was extracted with ether after filtering off the crystalline 4-nitro derivative More of the oily substance can be expressed from the crystals On evaporation of the ether a dark oily substance remains which will not crystallize on cooling It cannot be distilled without decomposition It forms a dark red sodium salt Khotinsky prepared a methoxy derivative which melted at 88°

Gibson (22) could not isolate the 2 nitro cresol from this methoxy derivative He used the method of Kaufmann and de Pay (23) for the preparation of nitro resorcinol which involves first a disulphonation, then nitration with subsequent splitting off of the sulphonic acid groups by superheated steam From meta-cresol he obtained a yield of yellow oil (80%) which would not crystallize, but which gave a methoxy derivative melting at 54° and an acetyl derivative, m p —59°

By hydrolysis of this acetyl derivative and steam distillation of the product he obtained an oil which crystallized, m p —41° Hodgson and Beard (24) modified Gibson's method by using a stronger fuming sulphuric acid and higher temperature in the initial sulphonation and obtained a product which solidified after the first steam distillation We are using this method for the preparation of 2 nitro 3-hydroxy-toluene

4 Nitro 3 Hydroxy 1-Methyl-Benzene—This compound is obtained simultaneously with the 2 nitro and 6-nitro isomers as shown above (21) Khotinsky observed that using Staedel's (25) method and lowering the temperature in the reaction mixture to −8° to −5° the best yields of 4 nitro-3 hydroxy toluene were obtained with correspondingly smaller amounts of the 6 nitro isomer and practically none of the 2 nitro derivative

However, cooling and maintaining the reaction mixture at this temperature is rather difficult when using an ordinary ice-salt freezing mixture Since ice could not be added directly to the reaction it was necessary to find some material which could, and at the same time have no effect in the reaction We employed solid carbon dioxide (26) and found it rather easy to obtain temperatures as low as −15° to −20° C with addition of only small amounts of solid CO_2 However, such low temperatures at the beginning of the nitration caused the acetic acid to crystallize and made it very difficult to stir to obtain a smooth reaction We finally added only a small amount of CO_2, lowering the temperature to −5°, and then after adding some of the cresol mixture, maintained the temperature at −10° to −12° by gradual addition of solid CO_2 The nitration can be done quickly and easily controlled within the desired temperature range, and at the same time better yields of the 4-nitro-cresol are obtained due to the low temperature

100 Gm of *m* cresol are dissolved in 100 cc of glacial acetic acid This is added to a solution of 114 cc of concentrated nitric acid in 290 cc of glacial acetic acid which has been cooled to −5° by the addition of a few pieces of dry ice (solid CO_2) about the size of small nuts As the cresol mixture is added gradually increase the amount of dry ice until the temperature reaches −12° C and maintain thus until the end of the reaction The mixture is then added to 2 liters of ice water Filter off the precipitate and steam distil In the distillate the 4 nitro 3 hydroxy-toluene separates Yield 33 Gm or 25% It can be recrystallized by solution in alcohol and precipitation in water It separates as yellow needles M p —56° The residue from the steam distillation contains about 60% of 6 nitro 3 hydroxy toluene which can be extracted by boiling water

5 Nitro 3 Hydroxy 1 Methyl-Benzene—By direct nitration of *m* cresol or by simultaneous diazotization and nitration of *m* toluidine, this compound cannot be obtained due to the directing influence of the hydroxyl group It is first necessary to prepare the corresponding 5 nitro-3 amino toluene This also cannot be prepared from the *m* toluidine by direct nitration Staedel (27) prepared it by a complicated procedure He nitrated *p* acetyl toluidine using an excess of fuming nitric acid forming 3 5 dinitro *p* acetyl toluidine This is hydrolyzed by refluxing with alcoholic NaOH The resulting 3 5 dinitro *p* toluidine is then diazotized in concentrated nitric acid and the diazo nitrate added gradually to boiling absolute alcohol The mixture is cooled quickly and added to a double volume of water The precipitate is 3 5 dinitrotoluol M p —91° This is then reduced by alcoholic ammonium sulphide to 5 nitro-3 amino toluene In some of these steps the yields were not given and we found them to be rather low The nitro cresol is obtained from the nitro toluidine using the method as in the case of 4 nitro 2 hydroxy toluene The yield is low only about 30% Recrystallized from benzene it melts at 89° C

6-Nitro 3-Hydroxy-1-Methyl-Benzene—It is the chief product in all methods mentioned above in which either *m*-toluidine or *m*-cresol are the starting materials By allowing the temperature to rise to 5°, in the nitration using acetic acid, the proportion of the 6-nitro-cresol can be increased

In order to separate the 6-nitro cresol from the other isomers it was previously necessary to steam distil the mixture, the 6-nitro derivative being non-volatile with steam We have found, however, that by extracting with boiling benzene practically all of the 2-nitro and 4-nitro isomers are removed and the difficultly soluble 6-nitro-3-hydroxy toluene remains, which after recrystallization from water is pure M p —130° C

The steam distillation can also be avoided by nitration of *m*-toluidine in sulphuric acid, obtaining 6-nitro-3-amino-toluene without contamination of any isomers This can then be diazotized and converted into the corresponding cresol, according to the procedure employed in the preparation of 4-nitro-2-hydroxy-toluene and 5-nitro-3-hydroxy-toluene The yield in the last step averaged 60%

NITRO PARA CRESOLS

2 Nitro 4 Hydroxy 1 Methyl Benzene —By direct nitration of *p* cresol practically none of this isomer is formed Simultaneous diazotization and nitration of *p* toluidine according to method of Noelting (2), produces very little of the 2-nitro derivative However, Noelting (28) found that in nitrating *p*-toluidine in sulphuric acid the 2 nitro-4 amino toluene was obtained without any contamination of the 3 nitro toluidine, especially when large amounts of H_2SO_4 were used Copisarow (29) using an adaptation of the method of Holleman and Holflake (30) prepared 2 nitro *p* hydroxy toluene by nitrating *p* cresyl carbonate Lucas and Liu (31) studied this reaction and explained the introduction of the nitro group meta to the hydroxyl as due to the formation of the oxonium salt

Knecht (32) and Nevile and Winther (12) converted the nitro toluidine into nitro-cresol by diazotization and replacement of amino group, using gentle heating with dilute sulphuric acid

We found that these latter methods gave poor yields and in some cases no cresol at all, only tar resulting from the reaction We applied the Ullman method, as used in the case of 4-nitro-2-hydroxy-toluene, and found it gave better results Care must be taken that in the addition of the diazotized solution of the nitro toluidine to the boiling sulphuric acid, heating should be continued until the red color which first forms changes to yellow This may take over a half hour but it is necessary to obtain a good yield A reflux condenser should not be used during the reaction, inasmuch as it seems to retard the color change On cooling, the crude 2-nitrocresol separates The yield after recrystallization from water is 50–55% It separates as yellow prisms M p —77–78°

3-Nitro 4 Hydroxy 1-Methyl Benzene —Hofmann and Miller (4), Staedel (25), Frische (33) nitrated *p* cresol in acetic acid and obtained fair yields of 3 nitro derivative By use of the methods of Noelting (2) and Deninger (3), starting with *p* toluidine, we obtained good yields The nitro cresol can be obtained from the corresponding nitro toluidine (Nevile (12)), which in turn is prepared by nitration of *p* acetyl toluidine with fuming nitric acid (sp gr = 1 5) (34) Schultz (8) claimed yields of 85–90% by nitrating *p* cresol in benzene Using this method we were unable to duplicate the yields, averaging only about 40% We finally adopted the method of Brasch and Freyss (35), by which we obtained consistent yields of 70–75%

SUMMARY

1 Nine of the ten possible isomeric nitro-cresols have been studied

2 The methods of preparation described in the available literature have been discussed

3 We have improved these methods and given in each case the procedure assuring the best results as to yield, purity and low cost of preparation

REFERENCES

(1) *D R P* 116,790, see also *Zentralblatt*, 1 (1901), 149
(2) *Ber*, 18 (1885), 1339
(3) *J prakt Chem* (2) 40 (1889), 299
(4) *Ber*, 14 (1881), 568
(5) *Ann*, 224 (1884), 175
(6) *Ber*, 18 (1885), 1512
(7) Gibson, *J Chem Soc*, 127 (1925), 42
(8) *Ber*, 40 (1907), 4319
(9) *Ibid*, 17 (1884) 269
(10) *Ibid*, 23 (1890) 3636
(11) Michel and Grandmougin *Ibid*, 26 (1893), 2349, Spiegel, Munblit and Kaufmann *Ibid*, 39 (1906), 3241
(12) *Ibid*, 38 (1905), 3790
(13) Nevile and Winther, *Ibid* 15 (1882), 2978
(14) *Ann*, 330 (1904), 95
(15) *J Chem Soc* 59 (1891), 1013
(16) *Ann*, 172 (1874), 221
(17) *Ber*, 13 (1880), 242
(18) *Rec trav chim*, 16 (1896), 426
(19) *J Chem Soc*, 81 (1902), 26, 87 (1905), 1265
(20) *Ann*, 225 (1884), 384
(21) *Ber*, 42 (1909), 3098
(22) *J Chem Soc*, 123 (1923), 1269
(23) *Ber*, 37 (1904), 725
(24) *J Chem Soc*, 127 (1925), 498
(25) *Ann*, 217 (1883), 51
(26) The method of using solid carbon dioxide for internal cooling was the material for copending patent applications by G W Raiziss and H Brahm of the Dermatological Research Laboratories and I T Thornton of the National Aniline and Chemical Co of Buffalo N Y
(27) *Ann*, 217 (1883), 187–205
(28) Same as reference 9, page 261
(29) *J Chem Soc*, 135 (1929), 251
(30) *Rec trav chim*, 36 (1916), 271
(31) *J Am Chem Soc* 55 (1933) 1271
(32) *Ann*, 215 (1882), 87
(33) *Ibid*, 224 (1884), 138
(34) Gattermann, *Ber*, 18 (1885) 1483
(35) *Ibid*, 24 (1891), 1960

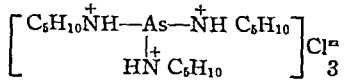
DERMATOLOGICAL RESEARCH LABORATORIES,
PHILADELPHIA, PA

ARSENOUS CHLORIDE AND 1,4-DIOXANE *

BY G O DOAK

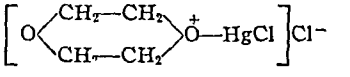
It has been shown in previous reports that arsenous chloride reacts with amines to form substituted ammonium halides, in which one, two or three of the chlorines were replaced by amine groups, the halogens being ionized in the resulting complex (1,9) Thus for example piperidine and arsenous chloride form the compound $(C_5H_{10}N\ HCl)_3As$ which may be written structurally as

* Scientific Section, A PH A Madison meeting, 1933



It is known that many oxygen compounds will form oxonium salts with acids and there is therefore a possibility that a compound in which the oxygen is relatively basic might combine with arsenous chloride to form a substituted oxonium halide similar to the ammonium halides formed between amines and arsenous chloride Bayer and Villiger (2) have pointed out that the same factors that influence the basicity of nitrogen do the same with oxygen Thus alkyl groups increase the basicity, phenyl groups decrease it They showed also that oxygen in such compounds as cineol and dimethyl pyrone is strongly basic Collie and Tickle (3) showed that dimethyl pyrone and diacetylacetone formed oxonium salts with a number of acids

Dioxane having become readily available in a fairly pure state, it seemed desirable to study its additive capacity toward $AsCl_3$ Paterno and Spallino (4) have shown that this substance combines with mercuric chloride to give a compound of the formula $(C_4H_8O_2)\ HgCl_2$ If this is regarded as an oxonium salt it will possess the structure



1,4-Dioxane also forms a sulphate $(C_4H_8O_2)_2H_2SO_4$, which may also be regarded as an oxonium salt

Experimental—Commercial 1,4 dioxane was dried for one week over metallic sodium and distilled, the fraction boiling 101–102° being taken 26 4 Gm ($^3/_{10}$ mole) were placed in a flask cooled with ice, and equipped with a mechanical stirrer, and 9 06 Gm ($^1/_0$ mole) of arsenous chloride added dropwise At first there was no sign of a reaction then a heavy white precipitate formed When all the arsenous chloride had been added the mixture was warmed The precipitate dissolved on slight warming but crystallized out on cooling The crystals were filtered off, and a second crop obtained by evaporating the solvent Yield of crystalline substance—6 Gm The crystalline product was soluble in ethyl alcohol, ethyl ether, acetone and benzene insoluble in cold heptane, soluble in warm heptane With water a precipitate of arsenous oxide was formed Melting point, 62° C It possessed a strong odor of arsenous chloride, appeared to be deliquescent and left an oily spot on paper

Chlorine analysis according to Stepanow (5) yielded 33 66% and 33 86%

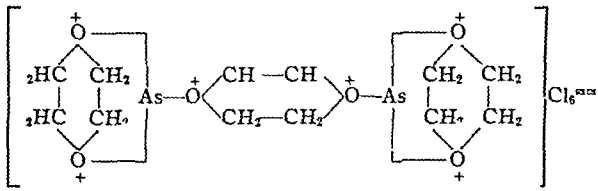
Arsenic analysis according to Morgan and Walton (6) yielded 23 84% and 23 69%

These results would correspond to the formula $(C_4H_8O)_32AsCl_3$ with a chlorine content of 33 67% and an arsenic content of 23 93%

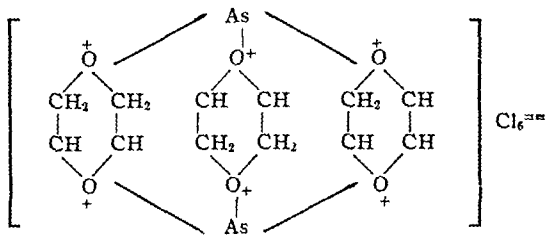
However, the substance appeared to be quite hygroscopic and it is possible that it may be a hydrate Thus for the formula $(C_4H_8O)\ AsCl_3\ 2H\ O$ the theoretical value for chlorine is 34 55% and for arsenic 24 55% The reaction was run a second time, taking precautions that all moisture was excluded and the crystals dried for two days over $P\ O_5$ in a vacuum The sample for analysis was transferred from the desiccator to a tared weighing bottle filled with absolute alcohol In this way the absorption of moisture from the air was prevented during the weighing process Chlorine found 33 57% It is thus apparent that the substance is not a hydrate but corresponds to the formula $(C_4H_8O)_3\ 2AsCl_3$

The molecular weight was determined in benzene by depression of the freezing point Molecular weight found 157, theoretical for $(C_4H_8O)_3\ 2AsCl_3$ 626 6 It is apparently highly dissociated in benzene solution Unless it ionizes to give three chlorine ions and a positive ion

(157 × 4 = 628) which seems unlikely the substance cannot be completely dissociated in benzene It would seem most probable that it dissociates into its component molecules $3C_4H_8O$ and $2AsCl_3$, which should give a molecular weight of 125 if completely dissociated According to the Nernst Thompson rule the dielectric constant of the solvent greatly influences the dissociation of the solute, hence, if this substance is dissolved in a solvent of higher dielectric constant there should be greater dissociation and hence a smaller molecular weight Acetone was chosen as a solvent (Dielectric constant for acetone 21 4, for benzene 2 82 (7)) Molecular weight was determined by elevation of the boiling point using the McCoy apparatus (8) Molecular weight found, 148 4 It would thus appear that the substance is highly dissociated more so in acetone than in benzene If it is an oxonium halide two structures are possible



I



II

I is the more probable as it contains five-membered rings as compared to ten-membered in II In support of the oxonium structure, the substance dissolved in absolute alcohol precipitates silver chloride with alcoholic silver nitrate solution, while arsenous chloride in absolute alcohol gives no precipitate with alcoholic silver nitrate This indicates that even in a solvent possessing such high dissociating powers as ethyl alcohol, chlorine is present as chloride ion

REFERENCES

(1) G O Doak, *Thesis* Univ of Wisc (1934)
(2) Bayer and Villiger, *Ber* 34 (1901) 2679
(3) Collie and Tickle *J Chem Soc*, 75 (1899), 710
(4) Paterno and Spallino *Atti accad Lincei*, 16 (1) (1907), 87
(5) Stepanow *Ber* 39 (1906) 4056
(6) Morgan and Walton *J Chem Soc* (1932), page 280
(7) *International Critical Tables* Vol VI pages 86 and 90
(8) McCoy, *Am Chem J*, 23 (1900) 353
(9) C S Leonard, *J A C S* 43 (1921), 2618

PHARMACEUTICAL EXPERIMENT STATION,
UNIVERSITY OF WISCONSIN

A STUDY OF THE CONSTITUENTS OF SIAM BENZOIN IN RELATION TO THEIR PRESERVATIVE ACTION ON LARD *[1]

BY WILLIAM J HUSA[2] AND DONALD E RILEY [3]

INTRODUCTION

The preservative action of benzoin on lard was discovered in France by Des champs (1) in 1843, and since that time benzoinated lard has become official in a dozen of the leading pharmacopœias of the world (2) Although Siam benzoin is widely used as a preservative of fats, the mechanism of its effect of retarding the development of rancidity has not been well understood The stabilizing effect of benzoin was commonly ascribed to the antiseptic action of its constituents, until Husa and Husa (3), in 1926, called attention to the inadequacy of this ex planation and indicated that the benzoin probably functions as a negative catalyst of oxidation A search of the literature having shown a lack of agreement as to which constituents of benzoin are effective in retarding the rancidity of lard, the effect having been variously ascribed to benzoic acid, cinnamic acid, volatile oil, resin and odorous constituents, Husa and Husa (3) carried out experiments which proved that benzoic acid and cinnamic acid are not effective in retarding the development of rancidity in lard Although the value of benzoin as a preservative of lard seemed well established in the older literature, some question arose as to whether or not it really exerted a preservative action, hence some experiments were carried out on this point in 1930 by Husa (4) and it was found that plain lard deteriorated several times as rapidly as benzoinated lard

It having thus been shown that Siam benzoin has a definite preservative action on lard, due to some constituents other than benzoic and cinnamic acids, the present investigation was carried out with the purpose of determining which constituents of Siam benzoin are responsible for the retardation of rancidity

HISTORICAL REVIEW

Constituents of Siam Benzoin —Benzoic acid was obtained by the destructive distillation o benzoin as early as 1556 (5) The acids of benzoin were studied by Kolbe and Lautemann (6 and by Lowe (7), the latter showed that at least some of the benzoic acid was present in the fre state Curtiss (8) obtained a higher yield of benzoic acid by sublimation than by extraction Schlickum (9) attempted to separate the constituents of benzoin and Moody (10) reported the presence of cinnamic acid in benzoin

In 1893, Fritz Ludy, under the direction of A Tschirch made the first thorough investiga tion of the constituents of Siam benzoin (11) Ludy found that Siam benzoin consisted mainly of a mixture of benzoic acid esters of two alcohols, benzoresinol and siaresinotannol Benzoresinol, $C_{16}H_{6}O$, was a white crystalline substance, melting at 272–274° C , several derivatives were pre-pared Siaresinotannol, $C_{12}H_{14}O_3$ was a brown, amorphous substance Ludy isolated the mix ture of the two esters by repeated precipitation of an ethereal solution with petroleum ether, re

---

* Scientific Section, A PH A , Madison meeting, 1933

[1] This paper is based on a thesis presented to the Graduate Council of the University of Florida by Donald E Riley, in partial fulfilment of the requirements for the degree of Master of Science in Pharmacy

[2] Head Professor of Pharmacy, University of Florida ,

[3] Holder of a University of Florida Graduate Scholarship, 1932–1933

moving the last traces of free benzoic acid with 0 1% NaOH solution This produced a light yellow, resin like, transparent, brittle odorless and tasteless mass melting at 65° C Upon saponification with KOH, it yielded 38 2% benzoic acid, 56 7% siaresinotannol and 5 1% benzoresinol Besides this resin mixture, Ludy found that Siam benzoin contained 0 15% vanillin, some free benzoic acid and 0 3% of an oily aromatic, neutral liquid which proved to be an ester of benzoic acid, the alcohol of the ester was thought to be possibly cinnamyl or benzyl alcohol, but owing to the small quantity was not definitely identified

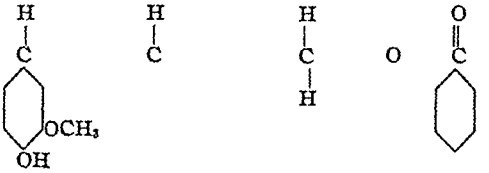
In the same year an article by J Salkind (12) contained statements that in Siam benzoin the benzoic acid is present as the ester of benzoresinol and resinotannol, with a small quantity free that vanillin was present and that cinnamic acid and benzyl benzoate could not be detected

Cocking and Kettle (13) reported on the analytical characteristics of benzoin

Our present knowledge of the constituents of Siam benzoin is based largely on the investigations carried out by Friedrich Reinitzer (14) He stated that Siam benzoin in the form of tears is entirely crystalline, melting at 59° C , and that upon warming to 40–50° C , its color changes to yellowish red and it finally becomes brown and amorphous due to oxidation

Reinitzer concluded that in its pure state, Siam benzoin consists mainly of crystalline coniferyl benzoate mixed with some free siaresinolic acid and benzoic acid and a small proportion of cinnamyl benzoate On standing in presence of air, the coniferyl benzoate tends to change to the brown amorphous form, probably with some oxidation and polymerization, the change being hastened by heat and light Traces of vanillin appear in older samples of benzoin

Coniferyl benzoate $C_{17}H_{16}O_4$, was obtained in colorless, monoclinic crystals, m p 72 8° C , best preserved in the dark at a low temperature in absence of air, to prevent change into the brown amorphous form This compound was called lubanol benzoate at first, but later lubanol was found to be identical with coniferyl alcohol According to Zinke and Dzrimal (15) coniferyl alcohol is identical with guaiacresinol, laricresinol and pinoresinol and the structure of coniferyl benzoate is as follows



Coniferyl benzoate

Siaresinolic acid was obtained in crystals m p 279° C , it was not affected by oxygen and did not turn brown Zinke and Lieb (16) reported a m p of 280–281 5° C for siaresinolic acid, and found the formula to be $C_{30}H_{48}O_2$ COOH

The composition of Siam benzoin was reported by Reinitzer as follows

Constituent	Fresh Resin	Old Resin
Crystalline coniferyl benzoate	77 8%	67 8%
Amorphous coniferyl benzoate		10 0
Free benzoic acid	11 7	11 7
Siaresinolic acid	6 0	6 0
Cinnamyl benzoate	2 3	
Cinnamyl benzoate and vanillin		0 3
Water	2 2	2 2
' Geweberste"		2 0
	100 0%	100 0%

The amorphous coniferyl benzoate is present in varying amounts depending on the age and conditions of storage of the resin

Tests for Rancidity —The first step in the development of rancidity is the addition of a molecule of oxygen at the double bond of an unsaturated fatty acid forming a peroxide In the second

step, the fat is oxidized by the peroxide, forming aldehydes, ketones and other compounds responsible for the characteristic odor and taste of rancid fats (17) Some of the tests for rancidity are based on detection or determination of the peroxides formed in the first step, while others involve the aldehydes, ketones, etc , formed in the second step

EXPERIMENTAL PART

Method of Determining Rancidity —It has long been known that rancid fats liberate iodine from potassium iodide Since the amount of iodine liberated from KI by a rancid fat gives a measure of the peroxides present in the fat, this principle has been used as the basis of a quantitative determination of incipient rancidity A number of methods are available based on this principle, differing only in details Four such methods were tried, including those of Szahlender (18), Wheeler (19), Caldwell and Dye (20) and Taffel and Revis (21), in our hands Wheeler's method appeared to give somewhat more consistent results than the others and hence it was used in the experiments which follow Wheeler's method is as follows

From 3 to 10 Gm of oil is dissolved in 50 cc of a mixture of 60% glacial acetic acid and 40% chloroform and 1 cc of saturated solution of KI is added The mixture is stirred by a rotary motion of the flask and after 1 minute 100 cc of water is added and the liberated iodine titrated with 0 1*N* or 0 01*N* sodium thiosulphate, using starch as indicator

In the data which follow, rancidity is reported in terms of the number of cc of 0 01*N* sodium thiosulphate solution required to decolorize the iodine liberated from KI by 1 Gm of the fat, this value has been designated as the "degree of rancidity" by Szahlender (18) and this expression is used in the present report

A substance might interfere with the test used by liberating iodine, preventing the liberation of iodine or absorbing it after it was set free This possibility was eliminated, each substance being tested by adding it to lard of known degree of rancidity and analyzing the mixture as usual

Effect of Varying Percentages of Benzoin —Deschamps originally used 40 Gm of benzoin per Kg of lard The B P , the British Pharmaceutical Codex and the French Codex specify 30 Gm of benzoin per Kg , while the U S P amount is 10 Gm per Kg Hence experiments were conducted, using varying proportions of benzoin, incorporated by the U S P method, with the exception that closed vessels were used

TABLE I —EFFECT OF VARYING PERCENTAGES OF BENZOIN ON THE RATE OF DEVELOPMENT OF RANCIDITY OF LARD SAMPLES STORED IN AN OVEN AT 50° C

Percentage of Benzoin	Degree of Rancidity after				
	0 Days	1 Day	4 Days	12 Days	27 Days
0 00	0 18	0 53	9 46	29 40	29 98
0 25	0 18	0 31	0 67	1 15	1 82
1 00	0 17	0 26	0 47	0 95	1 13
2 00	0 17	0 20	0 42	0 84	0 98
5 00	0 17	0 19	0 41	0 76	0 82

The results in Table I illustrate the definite preservative effect of Siam benzoin and indicate that with increasing quantities of benzoin lard becomes increasingly stable toward autoxidation, although the use of 2% and 5% of benzoin does not

show much advantage over 1%, which is the U S P proportion Some experiments using 3% benzoin likewise showed that this proportion has practically no advantage over 1% Results similar to those shown in Table I were obtained in repetitions of the experiment, the samples in some cases being stored in diffused light at room temperature The samples were stored in colorless glass ointment jars More rapid results were obtained in the 50° C oven, the development of rancidity being about 10 or 15 times as rapid as at room temperature

Preservative Effect of Volatile and Non Volatile Portions of Siam Benzoin—Tests were carried out to determine whether or not the volatile constituents of benzoin are responsible for the preservative action on lard Powdered Siam benzoin was sprinkled on glass wool in a round bottom flask placed in an oil-bath and purified hydrogen passed in through a tube leading to the bottom of the flask, the hydrogen after passing from this flask was bubbled through lard contained in a large test tube which was also placed in the bath The purpose of the hydrogen was to facilitate the passage of vapors from the benzoin into the lard A blank determination was conducted with all conditions the same, with the exception that no benzoin was used The operation was carried out in several steps using fresh lard each time The oil-bath was first held at 60° C for two hours, and then at 90° C 120° C and 150° C for two hour periods in each case After the 150° C period, the bath was allowed to cool to 60° C and the residue in the flask used to benzoinate a portion of lard From the results of this experiment, it appeared that the preservative constituents of the benzoin remained in the portion non volatile at 150° C, since this was the only fraction showing any preservative effect

The experiment was repeated, with the lard kept in a separate bath at 50° C, thus eliminating overheating of the lard and reducing the likelihood of volatile constituents passing on through the lard instead of being absorbed The bath containing the benzoin was heated for two hour periods at 60°, 90°, 120°, 150° and 200° C, and the residue used for benzoinating a portion of lard as before The results verified the previous conclusion that the preservative constituents were non volatile at 150° C, but in this case the residue remaining after 200° showed no appreciable preservative effect, nor was such an effect noticeable in the fraction volatile at 200° It seems likely that the benzoin decomposed at 200°, as the residue was quite dark in color, in this connection Reinitzer reported that benzoin gave up benzoic acid when heated to 120–140° C, and if heated more strongly gave odors of eugenol and finally of guaiacol

Since the results of both tests indicated that the preservative constituents were non-volatile at 150° C, attention was next devoted to methods of isolation of the non-volatile constituents of Siam benzoin

Isolation of Constituents of Benzoin—The coniferyl benzoate was isolated by a method recommended by Reinitzer (14) Large tears of benzoin, as free as possible from the brown crust were washed with enough ether (chilled to 5° C) to partially cover the benzoin The mixture was frequently shaken and carefully observed When the tears began to appear white, the ether was poured off, this treatment serving to remove the brown crust The residue was dissolved in ether at room temperature, filtered, and petroleum ether added until the solution became turbid Then the flask was loosely stoppered and set aside at 0° C to crystallize After 12 to 20 hours, crystals were obtained, usually melting at 65° to 68° C Upon repeated recrystallization in the same manner, the coniferyl benzoate was obtained in crystals of m p 72 2° C (corr), as compared with the m p of 72 8° C reported by Reinitzer To obtain such a product, eight to twelve recrystallizations are required For the preliminary work, the substance was recrystallized four or five times, and a product melting at 69° to 70° C was obtained For the final experiments the product of highest purity was used

The siaresinolic acid was separated and purified by one of the methods given by Reinitzer A mixture of benzoin and 70% acetic acid was allowed to stand, with occasional shaking, until the pieces of resin had disappeared, leaving a layer of light yellow material in the bottom of the flask After filtration, the residue was washed with 70% acetic acid and then with water, the crystalline mass was then dissolved in hot alcohol and water added until the solution showed a slight turbidity, the mixture then being set aside to crystallize By this method, crystals melting from 263 3° to 265 5° C (corr) were obtained Repeated recrystallization from alcohol gave a

product melting at 268 9° to 270 0° C (corr) Neither of these crystalline products showed the presence of coniferyl benzoate by use of the ferric chloride color test

Cinnamyl benzoate was prepared by treating cinnamyl alcohol with benzoyl chloride

Effect of Constituents of Siam Benzoin on Rate of Development of Rancidity of Lard —In testing the effect of the various constituents of Siam benzoin, they were added to lard in the proportions that would be present in benzoinating lard by the U S P method on the basis of the analysis of Reinitzer Thus the amount of crystalline coniferyl benzoate used in the lard was 77 8% of the amount of Siam benzoin that would be used in the U S P method, and the corresponding pro portions were 6% for siaresinolic acid and 4% for cinnamyl benzoate (the latter being greater than would be present in the U S P amount of benzoin) Cinnamyl benzoate was tested in the proportion of 1%, as it was thought that the sample of cinnamyl benzoate used probably contained some unchanged cinnamyl alcohol The results are given in Tables II and III

TABLE II —EFFECT OF CONSTITUENTS OF BENZOIN ON THE RATE OF DEVELOPMENT OF RANCIDITY OF LARD SAMPLES STORED IN AN OVEN AT 50° C

Added Substance	Degree of Rancidity after				
	1 Day	6 Days	14 Days	35 Days	70 Days
None	0 36	2 08	6 50	13 20	14 85
Siaresinolic acid	0 34	1 97	6 02	10 93	12 55
Vanillin*	0 37	1 59	5 50	9 31	10 82
Coniferyl benzoate	0 35	0 59	0 76	1 46	1 55
Benzoin	0 38	0 64	0 80	1 44	1 51

* Added in proportion of 0 1%

TABLE III —EFFECT OF VARIOUS SUBSTANCES ON THE RATE OF DEVELOPMENT OF RANCIDITY OF LARD SAMPLES STORED IN AN OVEN AT 50° C

Added Substance	Degree of Rancidity after				
	4 Days	10 Days	21 Days	35 Days	42 Days
None	0 41	1 85	2 70	8 25	14 10
Cinnamyl benzoate	1 12	1 91	2 80	6 32	13 02
Cinnamyl alcohol	1 91	2 02	2 24	6 05	12 97
Benzoic acid*	0 45	1 55	2 52	7 77	13 85
Benzoin	0 26	0 61	0 77	0 83	0 96

* 0 1 Gm used in 50 Gm lard

The results indicate that coniferyl benzoate is the ingredient of Siam benzoin responsible for the preservative action on lard Siaresinolic acid has practically no preservative effect Vanillin gives some protection when present to the extent of 0 1%, but this proportion is higher than could be obtained from the U S P amount of Siam benzoin Cinnamyl benzoate showed no effect when used in the quantity that would be present in the U S P amount of Siam benzoin and further tests showed that it was likewise ineffective when more than 25 times this pro portion was used Cinnamyl alcohol had no effect The results with benzoic acid verified the previous report of Husa and Husa (3) that this compound has no effect on the development of rancidity in lard

It had previously been found by Husa and Husa (3) that Siam benzoin gives a pronounced red color in the Kreis test for rancidity In the present study, it was

found that coniferyl benzoate and vanillin similarly interfered with the use of the Kreis test However, since siaresinolic acid gave no color with the Kreis reagent, the Kreis test was used in following the rancidity of lard alone and lard containing siaresinolic acid The results fully confirmed the lack of preservative effect on the part of siaresinolic acid

As a further check on the results, observations were made as to the color changes in samples of ointment of potassium iodide, using the methods described by Husa (4) The results verified the previous conclusions as to the effects of coniferyl benzoate, siaresinolic acid and vanillin

The results with coniferyl benzoate, siaresinolic acid, benzoic acid and benzoin were also confirmed by the von Fellenberg (22) test for rancidity, this being a color test based on reaction of a fuchsin-sulphurous acid reagent with the aldehydes of the rancid fat

Following the regular procedure using Wheeler's test, it was found that Siam benzoin which had been stored for three months in an oven at 50° C , during which time it had turned to a reddish brown color, showed very inferior preservative power as compared with U S P benzoin

Since Siam benzoin does not dissolve completely in lard in the U S P benzoination process, it was of interest to observe the solubility in lard of the various constituents of benzoin In the proportions designated in the experiments, coniferyl benzoate and vanillin dissolved completely, while siaresinolic acid dissolved only partially

It has generally been found that negative catalysts of oxidation are themselves susceptible to oxidation, the lack of stability of coniferyl benzoate in air is thus in accord with the general rule

CONCLUSIONS

The constituent of Siam benzoin responsible for the preservative effect on lard is coniferyl benzoate Vanillin gives some retardation of the development of rancidity when present to the extent of 0 1%, but this proportion is higher than could be obtained from the U S P proportion of benzoin The other constituents of Siam benzoin, *i e* , siaresinolic acid, benzoic acid and cinnamyl benzoate, do not exert a preservative effect on lard

REFERENCES

(1) Deschamps *J pharm chim* [3] 4 (1843) 201
(2) Hager Handbuch der Pharmazeutischen Praxis," Vol 1 page 275
(3) William J Husa and Lydia M Husa, Jour A Ph A , 15 (1926), 1071–1074
(4) William J Husa *Ibid* , 19 (1930) 825–828
(5) *Am J Pharm* 48 (1876) 363
(6) Kolbe and Lautemann, *Ann* , 115 (1860), 113, *Ibid* 119 (1861), 136
(7) Julius Lowe, *Am J Pharm* 42 (1870) 369
(8) Albert C Curtiss *Ibid* 44 (1872) 485
(9) Schlickum, *Ibid* 54 (1882), 608 610
(10) Thomas F Moody *Ibid* , 60 (1888) 606
(11) Tschirch and Ludy, *Arch Pharm* , 231 (1893) 461, 500
(12) J Salkind *Pharm Post* (1893) 330 through *Am J Pharm* 65 (1893) 385
(13) Cocking and Kettle, Year Book of Pharmacy and Transactions of the British Pharmaceutical Conference' (1914), 357

(14) Friedrich Reimitzer, *Pharm Ztg*, 54 (1909), 791, *Arch Pharm*, 252 (1914), 341 *Ibid*, 259 (1921), 1 60, *Ibid*, 263 (1925), 347, *Ibid*, 264 (1926), 131
(15) Zinke and Dzrimal *Monatsh*, 41 (1920), 423, through *J pharm chim* [7] 24 (1921) 350
(16) Zinke and Lieb, *Monatsh*, 38 (1917), and 39 (1918) cited by Reimitzer, *Arch Pharm*, 259 (1921), 1
(17) Kerr and Sorber *Ind Eng Chem*, 15 (1923), 383
(18) L Szahlender *Pharm Ztg* 77 (1932) 369
(19) D H Wheeler, *Oil and Soap*, 9 (1932), 89, through *Chem Abstr* 26 (1932), 3128
(20) Caldwell and Dye *Ind Eng Chem*, 25 (1933), 341
(21) Taffel and Revis *J Soc Chem Ind* 50 (1931), 87
(22) Von Fellenberg, *Mitt Lebensm Hyg*, 15 (1924) 198, through *Chem Abstr* 18 (1924), 3731

College of Pharmacy,
University of Florida,
Gainesville, Fla

A COMPARATIVE STUDY OF MARYLAND SENNAS *[1]

BY FRANK J SLAMA

I Introduction

The Maryland sennas, with the exception of *Cassia Medsgeri*, were studied by botanists as far back as the seventeenth century At that time, Tournefort (1656–1708) placed them in the tribe *Cassia* and later Linné, in his Species Plantarum left this classification unchanged Willdenow, in his work, also accepted the classification of his predecessors However, in recent years botanists have questioned this classification and have divided the Maryland sennas into two Groups—*Cassia*, which includes *Cassia Marilandica* and *Cassia Medsgeri*, and *Chamæcrista*, which includes *Cassia nictitans* and *Cassia Chamæcrista* As a result, various papers have been written for and against the separation of the Maryland sennas but up to the present time, no definite conclusions have been reached

Most of the work attempting to decide the question has been carried out only upon the flowers and pods In this paper the leaflets of the Maryland sennas are studied and from their study it appears that results are obtained which will be of value in deciding this question As the study progressed, it became evident that the leaflets of the Maryland sennas possessed characteristics differing greatly from those of the official senna leaflets and it was decided best to include their study with that of the Maryland sennas

The leaflets of six sennas, therefore, were studied, the two official sennas, those of *Cassia Senna* and *C angustifolia*, and those of the four Maryland sennas, namely, *C Marilandica*, *C Medsgeri*, *C nictitans* and *C Chamæcrista* The official senna leaflets were obtained from stock while the Maryland sennas were obtained in the vicinity of Baltimore, Md, *C Marilandica* being found at Owings Mills, Md, and

---

* Scientific Section, A Ph A, Madison meeting, 1933

[1] From the laboratory of Charles C Plitt, Professor of Botany and Pharmacognosy, School of Pharmacy, University of Maryland Thesis submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfilment of the requirements for the degree of Master of Science

on the Hillen Road, *C nictitans*, on Gwynn Falls Driveway and in Brooklyn, Md , while *C Chamæcrista* was gathered at Garland, Rosedale and Essex, Md *C Medsgeri* which is rarely found in the neighborhood of Baltimore was discovered (1) at a point east of Carney, Md

II Descriptive Studies

a macroscopic

1 Average Sizes of Leaflets—The Maryland senna leaflets were pressed immediately after collecting and within an hour they were measured The average sizes are as follows *C Marilandica*, 42 68 mm by 15 48 mm , *C Medsgeri*, 35 15 mm by 13 25 mm , *C nictitans*, 8 45 mm by 2 25 mm and *C Chamæcrista*, 10 75 mm by 3 25 mm

The official senna leaflets were taken from stock and their average sizes are *C angustifolia*, 26 mm by 7 85 mm , *C Senna*, 22 6 mm by 8 1 mm

2 Venations—Examining the venation of the leaflets, it is readily seen that the venation occurring in *Cassia nictitans* and *C Chamæcrista* differs greatly from that of the four remaining species In these two sennas the midrib is closer to one margin and consequently it divides the leaflets into two unequal parts, the larger showing the veins more numerous and longer and usually with three veins originating at the petiolule The average leaflet of the official sennas, *C Marilandica* or *C Medsgeri*, has the midrib running practically through the center of the leaflet and veins on each side of the midrib similar in size and number Furthermore, the veins in the leaflets of *C nictitans* and *C Chamæcrista* are seen extending very close to the margins without any apparent division into veinlets, whereas the four remaining senna leaflets show the terminal branches of the veinlets anastomosing near the margins This effect, which is seen more clearly in *C Marilandica* and *C Medsgeri*, is also characteristic of the leaflets of the official sennas This peculiar effect is never found in either *C nictitans* or *C Chamæcrista*

3 Other Observations—(*a*) *C Marilandica* and *C Medsgeri* are perennials, *C nictitans and C Chamæcrista* are annuals Their seeds are found germinating during first week of May, about the same time shoots of *C Marilandica* and *C Medsgeri* are seen sprouting from underground rootstocks The official sennas are shrubs

(*b*) The Maryland sennas behave rather uniformly also in the fall of the year About October 1st, they begin to disappear, the annuals dying to the ground and the perennials losing their leaves Within two or three weeks, they have practically disappeared

b microscopic

1 A Study of the Stomata—The epidermis after removal is dehydrated by passing it through, and allowing it to stay from half to one hour in each of the following alcohols—35%, 50%, 70%, 85%, 95% and absolute alcohol in the order given Before passing the epidermis from 50% to 70% alcohol, the specimen is stained for five minutes in Delafield's hematoxylin and then washed in 50% alcohol From absolute alcohol it is passed into oil of clove where it remains for ten minutes It is then mounted in Canada balsam

Study of the Upper Surfaces of the Leaflets —All the stomata were examined under a magnification of 450 diameters Figures 1, 2 and 3 show the upper epidermis of *C Marilandica*, *C Medsgeri* and *C nictitans*, respectively Superficial examination shows them free of stomata, as in the figures, closer study shows, however, that some stomata may be present, thus *C Marilandica* and *C Medsgeri* may have stomata occasionally only along the midrib whereas in *C nictitans*, stomata may be found along the midrib, at the base and apex and near the margins, the number along the midrib increasing from the base to the apex However, if the epidermis of that portion of the leaflet, a short distance within the margin and from the midrib, is examined, stomata are practically absent

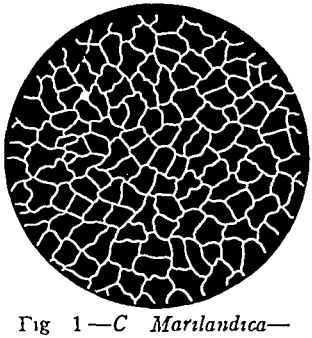


Fig 1 —*C Marilandica*— Upper epidermis

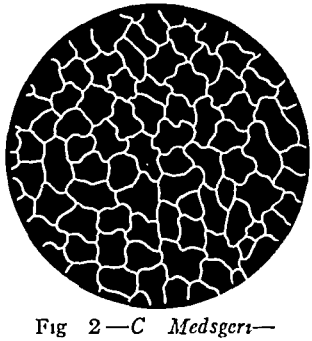


Fig 2 —*C Medsgeri*— Upper epidermis

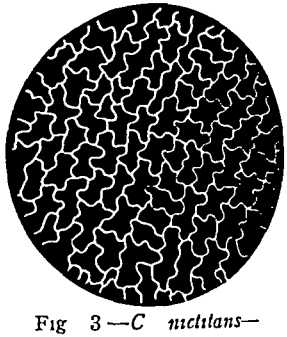


Fig 3 —*C nictitans*— Upper epidermis

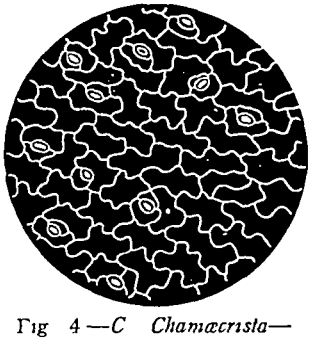


Fig 4 —*C Chamæcrista*— Upper epidermis

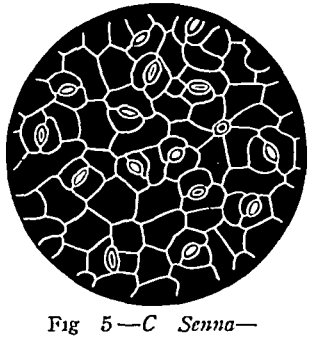


Fig 5 —*C Senna*— Upper epidermis

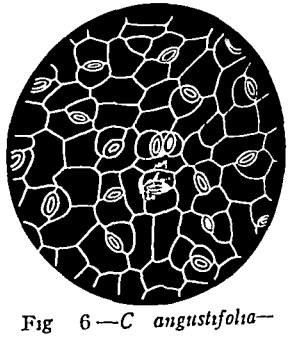


Fig 6 —*C angustifolia*— Upper epidermis

A study of the upper epidermis of the other three species of *Cassia*, *C Chamæcrista* (Fig 4), *C Senna* (Fig 5), *C angustifolia* (Fig 6), reveals that all three are provided with stomata In *C Chamæcrista* they are distributed uniformly, whereas in the remaining two, they are not, there being in each fewer stomata along the margin

Characteristic of the stomata of the upper epidermis of *C Senna* and *C angustifolia* (Fig 6) is the occasional touching of the guard cells of two adjacent stomata More frequent is the separation of two stomata only by their neighboring cells The upper epidermises of the Maryland sennas studied never have the guard cells of two stomata touching *C Chamæcrista* frequently shows the neighboring cells separated by one epidermal cell, whereas in *C nictitans*, the neighboring cells are rarely separated by one epidermal cell but by two or more, usually many

Study of the Lower Surfaces of the Leaflets —The stomata on the lower epidermis

of the six sennas examined are more uniformly distributed, although their number may decrease along the margins Figures 7 to 12, inclusive, show the lower epidermises of the sennas and it is readily seen that the stomata of the official sennas, upon the whole, are the largest The stomata of *C nictitans* and *C Chamæcrista* often are situated not in the center of the two neighboring cells, but pulled toward one neighboring cell, making that cell much smaller than the other This condition also occurs in the official sennas and in *C Marilandica* and *C Medsgeri* but to a lesser degree However, with *C nictitans* and *C Chamæcrista* this is markedly so and aids in their identification *C nictitans* has stomata which are smaller than those of *C Chamæcrista*, there is a greater number per square mm and the stomata of the former are nearly spherical in outline while those of the latter are elliptical

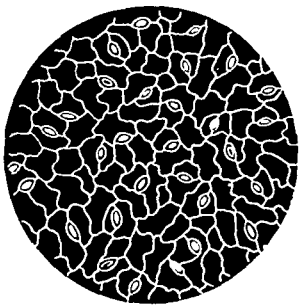


Fig 7—*C Marilandica*—Lower epidermis

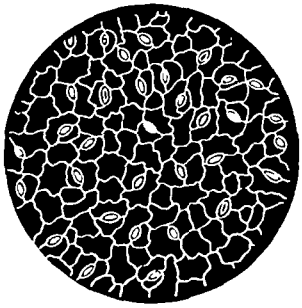


Fig 8—*C Medsgeri*—Lower epidermis

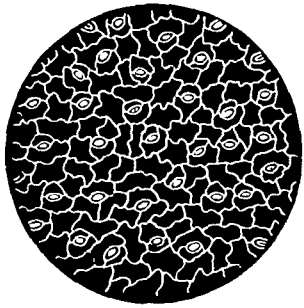


Fig 9—*C nictitans*—Lower epidermis

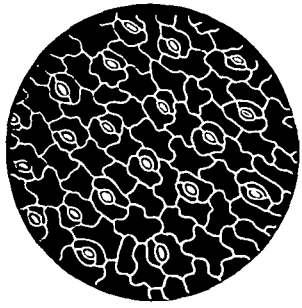


Fig 10—*C Chamæcrista*—Lower epidermis

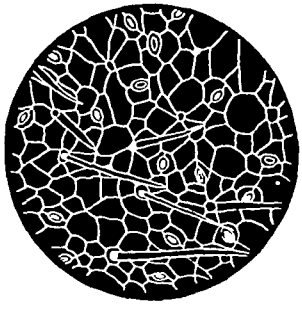


Fig 11—*C Senna*—Lower epidermis

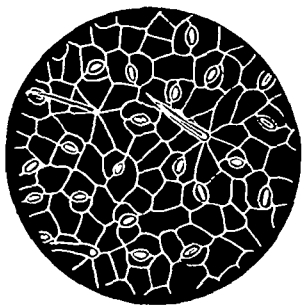


Fig 12—*C angustifolia*—Lower epidermis

Table I gives the results of the study of the stomata found on the upper and lower surfaces of the official sennas and of the Maryland sennas

TABLE I—STOMATA OF THE OFFICIAL SENNAS AND OF THE MARYLAND SENNAS

Plant	Stomata per Sq Mm U E	Stomata per Sq Mm L E	Average Size Stomata (Microns) U E	Average Size Stomata (Microns) L E	Ratio of Shorter Diameter to Larger U E	Ratio of Shorter Diameter to Larger L E
Alexandria Senna	189 4	215 1	21 73 × 28 68	20 16 × 26 73	0 758 to 1	0 754 to 1
India Senna	203 5	266 4	21 95 × 29 92	18 76 × 26 81	0 73 to 1	0 7 to 1
Cassia Marilandica		349 9		22 08 × 28 46		0 776 to 1
Cassia Medsgeri		250 5		17 15 × 21 98		0 78 to 1
Cassia Chamæcrista	143	219 7	13 89 × 20 56	16 53 × 23 51	0 68 to 1	0 703 to 1
Cassia nictitans	?	358 0	13 06 × 16 77	14 23 × 19 2	0 78 to 1	0 742 to 1

In the first column for *C nictitans*, a question mark is placed Whether this space should be left blank or filled in, depends entirely upon the portion of the leaflet examined If the upper epidermis is examined close to the margins or along the midrib, and as along these areas stomata are found, this space should be filled However, in order to give the approximate average size of the stomata on the upper epidermis, ten were examined and the results were included in Table I

The table shows (1) the stomata of the upper and lower epidermis of Alexandria Senna are approximately the same size, (2) the stomata on the lower epidermis of India Senna are somewhat smaller than those of the upper epidermis, (3) the difference in the sizes of the stomata of the official sennas could hardly be used as a means of separating them under the microscope, (4) *C Marilandica* and *C Medsgeri* have no stomata upon the upper surfaces unless the area near the midrib is examined and there they are found occasionally, (5) with *C Chamæcrista* stomata are found on both surfaces of the leaflet, the stomata on the upper surface being the smaller, (6) *C nictitans* has stomata uniformly distributed on the lower epidermis only, (7) the stomata of *C Chamæcrista* are larger than the stomata of *C nictitans* and (8) the stomata of the official sennas upon the whole are the largest studied

2 Neighboring Cells —The results of a study of the neighboring cells of the sennas are shown in Table II

TABLE II —NEIGHBORING CELLS

Plant	No Stomata Examined	Stomata (2 N C)	Stomata (3 N C)	Stomata (4 N C)	Stomata (5 N C)
Cassia Senna	150	144	6		
C angustifolia	150	129	17	4	
C Marilandica	300	203	65	28	4
C Medsgeri	315	291	14	7	3
C Chamæcrista	220 (U E)	220			
	310 (L E)	310			
C nictitans	425	357	62	6	

This table shows (1) that stomata with two neighboring cells predominate, (2) making use of the possibility of five neighboring cells we can readily divide the above sennas into three groups, the official sennas without five neighboring cells, two Maryland sennas with five neighboring cells and two Maryland sennas without five neighboring cells, (3) furthermore each of the three main groups may be separated into its two components thus *C angustifolia* is readily separated from *C Senna* as the former exhibits a greater number of stomata with three neighboring cells and it is the only official senna having stomata with four neighboring cells, stomata with three neighboring cells and four neighboring cells occur to a greater degree in *C Marilandica* than in *C Medsgeri*, and *C Chamæcrista* always shows its stomata accompanied by only two neighboring cells while in *C nictitans* stomata with three and four neighboring cells are present

3 Epidermal Cells —Attempt was made to separate the sennas by means of a study of their epidermal cells It was noted that the thickness of the cell wall is of no value as approximately the same thickness of cell wall exists in each senna and that the epidermal cells vary in shape to such an extent as to make the measuring of the cells of no value, nevertheless, the epidermal cells, like the neighboring cells, have characteristics which are of value in separating the sennas into three groups

Because of the trichomes on the epidermis, the official sennas have certain epidermal cells that are very characteristic The base of each hair is surrounded by four to nine epidermal cells similar to the spokes of a wheel so that the portion of each cell adjacent to the base of the hair is more narrow than that at the opposite side Usually, six epidermal cells accompany a hair in each of the official sennas, and with both sennas, variability in the shape of these cells occurs

The other epidermal cells are of various shapes, but the outline of each is made up of straight lines, or lines that are just slightly curved

Maryland sennas show hairs to be absent and, as a result, the characteristic epidermal cells that are present in the official sennas, are absent

The epidermal cells of *C Medsgeri* and *C Marilandica* are more undulate on the lower epidermis and are practically the same size as the largest neighboring cell The epidermal cells of *C Marilandica* are approximately the same size as those of *C Medsgeri* but those of *C Marilandica* tend to be square-like while those of *C Medsgeri* are very undulate Now, just as in the case of their neighboring cells, certain ones of *C Medsgeri* may look like those of *C Marilandica* and certain ones of *C Marilandica* look like those of *C Medsgeri*, so the epidermal cells of *C Marilandica* may sometimes become undulate while those of *C Medsgeri* appear square-like, but an examination of the center portion of the leaflets will show the typical cells of each species

In comparing *C nictitans* and *C Chamæcrista*, the former shows the outline of the epidermal cells to be more undulate and its epidermal cells are on an average, slightly larger than the average neighboring cells, while *C Chamæcrista* exhibits epidermal cells which are much larger than the average neighboring cells In both cases, the epidermal cells found on the upper epidermis are slightly larger than those on the lower

4 Epidermal Hairs —On the upper and lower epidermis of *C Marilandica*, *C Medsgeri*, *C Chamæcrista* and *C nictitans*, hairs are absent whereas with the official sennas, hairs are present on both surfaces The apices and the midribs of the leaflets of the Maryland sennas also were examined for hairs with the following results Occasionally hairs are present on the tips of *C Marilandica* and *C Medsgeri* leaflets and rarely, also on the midrib, but hairs are not found either on the apices or midribs of leaflets of *C nictitans* and *C Chamæcrista*

The arrangement of the epidermal cells around the hairs of the official sennas is already mentioned These arrangements were studied and the number of arrangements occurring on each epidermis was counted to ascertain if there was enough variation in them to be of value in identifying the official sennas As the hairs are more numerous on the lower surface of *C Senna* leaflets, more arrangements should be found here, and this proved to be true

For simplicity, each arrangement will be called an epidermal hair apparatus and will be designated by the abbreviation E H A This abbreviation when used will always represent the four to nine epidermal cells which arrange themselves in a circular fashion around the base of any hair The following table shows the distribution of hairs

TABLE III —DISTRIBUTION OF HAIRS

Plant.	Epidermis Examined	Av No E H A in a Field	Average Size of Hairs	Size of Largest Hair
India Senna	Upper	0 06	105 0 microns long	188 4 microns long
	Lower	1 83	13 9 microns in dia	19 3 microns in dia
Alex Senna	Upper	1 72	114 0 microns long	216 0 microns long
	Lower	12 10	12 5 microns in dia	16 6 microns in dia

NOTE In each case, 50 fields were examined

From the results obtained, it is readily seen that, by means of the E H A 's the upper epidermis of *C angustifolia* can be distinguished from that of *C Senna* and the same holds especially true for the lower surfaces of these two official sennas But it would be more difficult to distinguish the upper epidermis of *C Senna* from the lower of *C angustifolia*, the average of the E H A 's of the former being 1 72 and of the latter 1 83 Here the E H A 's are of no help and another method for their separation must be applied Under the heading of neighboring cells, it was concluded that stomata with three neighboring cells are found more often in *C angustifolia* and stomata with four are rarely found in *C Senna* If this method is applied, the upper epidermis of *C angustifolia* is recognized as it shows stomata with three neighboring cells to be present more often and occasionally a stoma with four, the absence of which would determine the lower epidermis of *C Senna*

Hairs are found along the midrib, upon both epidermal surfaces of *C angustifolia*, being more numerous upon the lower surface Upon both surfaces the number of hairs increase as one passes from apex to the base of the leaflet The distribution of hairs on *C Senna* is the same as on *C angustifolia*, except that they are far more numerous, exceeding the number found there, vastly

The apices of one hundred leaflets of each of the two official sennas were examined *C Senna* usually shows hairs present, the number varying from one to many, occasionally, however, an apex without a single hair is observed *C angustifolia* usually shows apices without hairs, but occasionally an apex with hairs is noted

5 *Margins* —The margins of the senna leaflets were studied and the sennas with similar margins were grouped together, three groups being formed, the official sennas, *C angustifolia* and *C Senna* form one, *C Marilandica* and *C Medsgeri* another and *C nictitans* and *C Chamaecrista* the third, the following table making this clear

TABLE IV —COMPARISON OF MARGINS

Plants	Size of Largest Hair	Remarks
Alex Senna		The larger hairs appear on margins of India Senna
India Senna	52 25 microns long 23 5 microns in dia	In both sennas hairs are usually found with long diameters almost parallel to the margin and their tips pointing toward the apex Hairs are found at very irregular intervals
C Marilandica	933 microns long 24 microns in dia	The margins of these leaflets show large hairs *C Medsgeri* usually exhibits hairs parallel to the margin and tips of hairs touching the margin With *C Marilandica* hairs usually occur almost perpendicular to the margin
C Medsgeri	587 microns long 27 microns in dia	
C Chamaecrista	Hairs are absent Serrated margins	In *C Chamaecrista* the serrations extend from the base to the apex on both margins *C nictitans* shows one margin completely serrated and the other serrated about 1/5 of the distance from the base to the apex
C nictitans	Hairs are absent Serrated margins	

To summarize, the official sennas have margins of leaflets almost free of hairs, only occasionally is a small hair found, the margins of leaflets of *C Medsgeri* and *C Marilandica* have large hairs, and the margins of the leaflets of *C Chamaecrista*

and *C nictitans* are more or less serrated, those of the former being serrated along both margins, whereas in *C nictitans*, one margin alone is completely serrated and the other is serrated only about one-fifth of the way from the base to the apex

6 Apices—The results of a study of the apices of the senna leaflets studied are shown in Table V

TABLE V—A COMPARISON OF APICES

Plant	Av Size Tip	Remarks
C angustifolia	261 microns long 250 microns wide	The apices are about as long as wide and are either conical or ball-shape *C Senna* usually shows apices with hairs present *C angustifolia* usually shows apices without hairs
C Senna	246 microns long 246 microns wide	
C Marilandica	584 microns long 211 microns wide	These sennas exhibit apices which are similar but those of *C Marilandica* are about three times as long as wide The apices of *C Medsgeri* are about twice as long as wide The apices taper slightly
C Medsgeri	316 microns long 175 microns wide	
C Chamæcrista	283 microns long 150 microns wide	The apices of *C nictitans* are about three times as long as wide and those of *C Chamæcrista* are about twice as long as wide The apices taper to a sharp slender point
C nictitans	433 microns long 133 microns wide	

The above table shows that it is possible to separate the sennas into the 6 species by the appearance of their apices

7 Petiolules—It was also found that the sennas could be separated into three groups by means of the petiolules which are classified as large, medium or small

C Marilandica and *C Medsgeri* have the large petiolules, 500 to 750 microns wide and 1250 to 2100 microns long, the official sennas, the medium-sized, 500 to 850 microns wide and 675 to 1100 microns long and with *C nictitans* and *C Chamæcrista*, the petiolules are very small The chart that follows shows the most important characteristics of the petiolules

Petiolules
- Large
  - Rarely without hairs, hairs numerous—*C Medsgeri*
  - Occasionally with hairs hairs not numerous—*C Marilandica*
- Medium
  - Hairs numerous on petiolules and along outlines of petiolules—*C Senna*
  - Hairs not numerous on petiolules and along outlines of petiolules—*C angustifolia*
- Small—*C nictitans* or *C Chamæcrista*

8 Glands—The petioles of the sennas were examined for the presence of glands Numerous petioles of the official sennas were obtained from stock and in every case, no glands were seen

On the petioles of the Maryland sennas glands are always present Those of *C Marilandica* and *C Medsgeri* have conical glands while *C nictitans* and *C Chamæcrista* show cup shaped glands beneath the lowest pair of leaflets The latter plant possesses the larger cup-shaped glands A comparison of the glands is shown in Table VI

TABLE VI —A COMPARISON OF GLANDS

Plant	Glands on Petioles	Remarks
C Senna	Absent	
C angustifolia	Absent	
C Marilandica	Present	Conical or club shaped glands
C Medsgeri	Present	Conical glands
C Chamaecrista	Present	Large cup shaped glands beneath the lowest pair of leaflets
C nictitans	Present	Small cup shaped glands beneath the lowest pair of leaflets

9 *Cross Section of Leaflets* —In studying the cross sections of the leaflets, the palisade tissue was the determining factor in the separation of the official sennas and the Maryland sennas The official sennas (2) possess two layers of palisade tissue, one layer near the upper surface and another, near the lower surface of the leaflet However, all the Maryland sennas show but one layer of palisade tissue which is adjacent to the upper surface

10 *Powdered Senna Leaflets* —All the sennas were examined, according to Sayre's (3) method A No 60 powder was made of each senna and to one half Gm of the powder in a small homeopathic vial, 6 Gm of a solution of equal parts of glycerin (sp gr 1 25) and water, were added The official sennas are readily differentiated, as Alexandria senna[1] shows 4 4 hair tips and India senna[2] one hair tip in a field, the low power objective being used These results are similar to those obtained by Sayre

The Maryland sennas may be identified as follows *C Marilandica* and *C Medsgeri* are determined by the shape of their epidermal cells although the number of stomata in the field, their size and the number of neighboring cells can be used to confirm the identification *C nictitans* and *C Chamaecrista* are also recognized by their epidermal cells and by the shape and size of their stomata The epidermal cells of *C Chamaecrista* are less undulate and larger than those of *C nictitans*, while the latter has smaller, nearly spherical stomata in contrast to those of *C Chamaecrista* which are elliptical and of which there are fewer per field

A No 60 powder was used to study the number of tips of hairs in the field, and, for the recognition of the powdered sennas, a No 20 powder In every case, the sample of the powdered leaflet was treated with a drop or two of a saturated aqueous solution of chloral hydrate for three to five minutes prior to its examination

11 *Microsublimation was also carried out but the results were not conclusive*

III COMPARISONS AND CONCLUSIONS

A comparison of the senna leaflets studied is shown in the following table

TABLE VII —A COMPARISON OF SENNAS

Group I *C Senna* and *C angustifolia*	Group II *C Marilandica* and *C Medsgeri*	Group III *C Chamaecrista* and *C nictitans*
1 Terminal branches of veinlets anastomose near the margins of the leaflets Effect is less pronounced than that of Group II	1 Terminal branches of veinlets anastomose near the margins of the leaflets	1 Terminal branches of veinlets end abruptly near the margins Veinlets do not anastomose

[1] *Cassia Senna*

[2] *Cassia angustifolia*

2 Largest stomata studied Occasionally, there are two stomata with their guard cells touching Stomata are accompanied by characteristic neighboring cells	2 Stomata are practically absent from the upper surfaces of these leaflets	2 Both surfaces of these leaflets show stomata present
3 Hairs are present on both surfaces	3 Hairs are absent from both surfaces	3 Hairs are absent from both surfaces
4 Occasionally very small hairs are found along the margins	4 Hairs of large size are present along the margins	4 Hairs are absent along the margins Margins are serrated
5 Two rows of palisade tissue	5 One row of palisade tissue	5 One row of palisade tissue
6 Petioles are devoid of glands	6 Petioles show the presence of conical or club shaped glands	6 Petioles show the presence of cup shaped glands
7 Plants are shrubs	7 Plants are perennial herbs	7 Plants are annuals
8 Apices are conical or ball shape	8 Apices taper slightly	8 Apices taper to a sharp, slender point

CONCLUSIONS

In conclusion, an examination of the three groups will bring out the following

(1) That there are three groups, each group being distinct in itself The resemblance of any group to each of the other two, is merely superficial

(2) The differences between Group I and the other two are far greater than the differences between these two groups It would therefore be only logical that, if Group III is separated from *Cassia*, Group I should also be separated from this genus We would therefore have Group I composed of the official sennas, consisting of *Cassia angustifolia* and *C Senna* (*C acutifolia Delile*), considered under a new Genus, *Senna*, and then recognized as *Senna angustifolia* and *S acutifolia*, Group II composed of *Cassia Marilandica* and *C Medsgeri* continued under Genus *Cassia* and Group III, composed of *Cassia nictitans*, and *C Chamæcrista*, under Genus *Chamæcrista* and known as *Chamæcrista nictitans* and *C fasciculata*, as already recognized by botanists

REFERENCES

(1) C C Plitt, *Cassia Medsgeri*, Shafer, in Md , *Jr Md Acad Sciences* Vol 1 (1930), 61
(2) Gilg Brandt Pharmacognosie,' 3 Auflage, 167
(3) L E Sayre, *Am J Pharm* , 69 (1897), 298–307

ABSTRACT OF PAPER PRESENTED BEFORE SECTION ON PRACTICAL PHARMACY AND DISPENSING A PH A , WASHINGTON MEETING 1934

'A Study of the Physical and Chemical Properties of a Number of Specimens of Calomel of American and European Manufacture,' by C H LaWall and J W E Harrisson

The authors have made an investigation of fourteen commercial samples of calomel, nine of which are of American manufacture and five of European manufacture

Especial attention was paid to the physical properties and the microscopic appearance, in the light of the U S P requirement that it should show only small isolated crystals when viewed under a lens having a magnifying power of one hundred diameters '

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

APPARATUS AND MANIPULATIONS

Bentley, A O
Galenical manufacture in the small pharmacy
Pharm J , 132 (1934), 465
Buchi
Apparatus for vacuum distillation on a small scale
Schweiz Apoth Ztg 72 (1934) 226 237 249
Obiger, F
Rational percolation
Pharm Ztg 79 (1934) 437
Sykes C H
A bacteria-proof filter
Pharm J , 132 (1934), 521

PHARMACOPŒIAS AND FORMULARIES

Franklin J H
Notes on the B P 1932
Pharm J , 132 (1934), 493
Schou, Svend Aage
Galenical preparations of the Danish Pharmacopœia of 1933
Arch Pharm og Chem 41 (1934), 300

PHARMACEUTICAL PREPARATIONS

Feist K
Notes on new forms of medicaments
Apoth Ztg 49 (1934), 647
Freudweiler R
New extract of aconite
Pharm Acta Helv 9 (1934), 49
Kurkhgof G A and Spektor M O
Preparation of bismuth citrate and lactate
Khim Farm Prom (1933), 123, through *J Soc Chem Ind* , 53 (1934) 348B
Kuhn, A
Homeopathic iron preparations
Pharm Zentr , 75 (1934) 131–134, through *J Soc Chem Ind* 53 (1934), 348B
Madsen C J T
Sterilization of sodium diethylbarbiturate solutions
Dansk Tids Farm 8 (1934) 62–71, through *J Soc Chem Ind* 53 (1934) 427B
Neugebauer H
Identification of homeopathic potencies of aloe
Pharm Acta Helv , 9 (1934), 57
Oberhard, J , and Katz E
Powdered extract of uva ursi
Khim Farm Prom (1933) 143–146 through *J Soc Chem Ind* 53 (1934) 348B
Palme, Herman
Stability of ointment of yellow mercuric oxide to light
Farm Revy 33 (1934) 277 293
Vickers, Maurice H
Sterilisation of hexamine solutions
Pharm J 132 (1934), 414

PHARMACOLOGY TOXICOLOGY AND THERAPEUTICS

Chen, K K , and Chen, A Ling
The action of crystalline thevetin, a cardiac glucoside of thevetia neriifolia
J Pharmacol & Exper Therap 51 (1934), 23
Chopra R N Gupta J C and Mukherjee B
The pharmacological action of an alkaloid obtained from Rauwolfia serpentina, Benth (A preliminary note)
Physiol Abstr 19 (1934) 143
David, J C and Rajamanickam N
The influence of anaesthetics on the biological assay of digitalis
Quart J Pharm & Pharmacol 7 (1934) 36
Dewar T
The histology of the leaves of Digitalis lutea
Quart J Pharm & Pharmacol , 7 (1934), 1
Dimson S B
The pressor actions of ephedrine and pseudoephedrine in man
Quart J Pharm & Pharmacol , 7 (1934), 23
Feinberg Samuel M
Pyrethrum sensitization
J A M A 102 (1934) 1557
Graham, Clarence F

Barium chloride poisoning
J A M A, 102 (1934) 1471
Hanzlik, P J, and Richardson A P
Cyanide antidotes
J A M A 102 (1934), 1740
Koppanyi, T, Murphy, W S and Krop S
Studies on barbiturates
Physiol Abstr, 19 (1934) 140
Langenbach Alfred M
Acquired sensitization to sodium isoamylethylbarbiturate (sodium amytal) as evidenced by cutaneous eruptions
J A M A, 102 (1934), 1376
Monro J E
Ephedrine and pseudo-ephedrine in spinal anesthesia
Quart J Pharm & Pharmacol, 7 (1934), 32
Mutch, N
Aspirin and calcium aspirin and their action on growing bone
J Pharmacol & Exper Therap, 51 (1934), 112
Nielsen Herman
Hormone preparations
Dansk Tids Farm, 8 (1934) 113
Ogata Hirano, and Tanaka
Researches on male sexual hormones
J Pharm Soc Japan No 626 (1934), 49
Peshkin M Murray, and Miller, Julius A
Quinine and ergot allergy and thrombocytopenic purpura
J A M A 102 (1934) 1737
Rao G S R
Pharmacological actions of some members of the tropane group
Quart J Pharm & Pharmacol, 7 (1934), 46
Reed, C I
Symptoms of viosterol overdosage in human subjects
J A M A 102 (1934) 1745
Rodin Frank H
Eyelash dyeing Some severe eye and systemic symptoms resulting therefrom
Calif & West Med, 40 (1934) 372
Sapeika, N
The action of atebrin on the uterus
Quart J Pharm & Pharmacol 7 (1934), 41
Sapeika N
The action of acriflavine on the uterus
Quart J Pharm & Pharmacol 7 (1934) 44
Sauer Louis W
The preparation of bacillus pertussis vaccine for immunization
J A M A 1, 102 (1934) 1471
Sharpe, J C
Bromide intoxication
J A M A 102 (1934) 1462
Tainter, M L
Low oxygen tensions and temperatures on the actions and toxicity of dinitrophenol
J Pharmacol & Exper Therap, 51 (1934), 45

ANIMAL AND VEGETABLE DRUGS

Danckwortt, P W Budde H and Baumgarten, G
Evaluation of derris root
Arch Pharm, 272 (1934) 561
Hoch J Hampton
The legend and history of Passiflora
Am J Pharm, 106 (1934), 166
Kariyone T and Kashiwagi K
Poisonous constituents of Coriaria japonica IV
J Pharm Soc Japan No 625 (1934), 31
Munesada T
Pharmacognostic investigation of the roots and rhizomes of some Scrophularia species
J Pharm Soc Japan, No 626 (1934) 41
Peyer, W
Difference in the seeds of the Solanaceæ
Pharm Zentralh 75 (1934) 313
Stephen Florence
The isolation of the active principles of Urginea burkei Bkr
Quart J Pharm & Pharmacol, 7 (1934), 57
Zellner, Julius
Study of the chemical constituents of medicinal plants native to Germany IV
Arch Pharm 272 (1934) 601

ALKALOIDS AND GLUCOSIDES

Charonnat Raymond, and Deglaude, Louis
Criteria of purity of crystallized digitalin
Bull sci pharmacol, 41 (1934) 192
Denigès, Georges
Assay of quinine hydrobromide by the cuprohydrobromic reaction
Bull soc pharm Bordeaux, 71 (1934) 253
Elgazin S
Preparation of anhydrous quinine
Khim Farm Prom (1933), 124–125, through *J Soc Chem Ind*, 53 (1934) 348B
Denigès Georges
Rapid identification of quinine hydrochloride
Bull soc pharm Bordeaux 71 (1934) 254
Kofler L and Kofler, A
Crystal forms and melting points of the opium alkaloids
Arch Pharm 272 (1934) 537
Lavoye M
Codeine iodide and hydroiodide

J pharm Belg, 16 (1934), 309

McDonnell, Thomas F, and Gardner, John H

Anthrone series V The structure of the so-called aglycone of aloin

J Am Chem Soc 56 (1934), 1246

Ortegren, R

Examination of the exact equivalents of some alkaloidal salts

Farm Revy, 33 (1934) 297

Rosenthaler, L

Analytical notes on "psikain-neu"

Pharm Acta Helv, 9 (1934) 59

ESSENTIAL OILS

Anon

Estimation of essential oil in drugs, spices and plant materials

Perf & Ess Oil Rec 25 (1934), 115

Beaugeard P

Balsam of Peru of commerce and its evaluation

Bull sci pharmacol 41 (1934) 209

Janot M

Analysis of a balsam from Salvador (Balsam of Peru)

Bull sci pharmacol 41 (1934), 219

Nelson, E K, and Mottern H H

Florida grapefruit oil

Ind Eng Chem 26 (1934) 634

Nelson, E K, and Mottern, H H

The occurrence of citral in Florida Valencia orange oil

J Am Chem Soc 56 (1934), 1238

OILS, FATS AND WAXES

Holmes Arthur D, and Remington, Roe

Arsenic content of American cod liver oil

Ind Eng Chem 26 (1934), 573

Paschke, B

Detection of foreign fats in cacao butter

Z Unters Lebensm, 67 (1934), 79–84 through *J Soc Chem Ind* 53 (1934), 368B

ANALYTICAL METHODS AND RESULTS

Barbour, A D

Comparison of various methods of determining iodine values, and their effect on the calculated results of fat analysis

Oil & Soap, 11 (1934), 7–10 through *J Soc Chem Ind*, 53 (1934) 368B

Buntzelman, N G

Determination of santonin

Khim Farm Prom (1933), 130–135, through *J Soc Chem Ind* 53 (1934), 348B

Cocking, T Testing

The alcohol limits of the British Pharmacopœia, 1932

Quart J Pharm & Pharmacol, 7 (1934), 76

Duncan, Ira J, and Dustman, R B

Quantitative determination of coumarin in plant material

Ind Eng Chem 26 (1934), 210

Flowerdew F J

Copper limits of the British Pharmacopœia

Pharm J, 132 (1934), 413

Reber, K, and Burgin, A

Contribution to the quantitative separation of the antipyretics

Schweiz Apoth-Ztg, 72 (1934) 209

Regnier, Jean and Neipp, Lucien

Contribution to the study of methods for counting bacteria

Bull sci pharmacol, 41 (1934), 231

Reimers F

Determination of mercury in pharmaceutical preparations

Arch Pharm, 272 (1934) 546

Rojahn, C A and Bohm, Kurt

Comparative tests of the viscosities of mucilagenous drugs of the German Pharmacopœia

Pharm Ztg, 79 (1934), 487, 512

Schulze, Konrad

Specific gravity table for the addendum to the German Pharmacopœia VI

Apoth-Ztg, 49 (1934) 544

Stempel, B

Bromometric determination of phosphorus in phosphorous solution of the D A B VI

Pharm Zentralh 75 (1934) 281

Sub Comm on Determination of Unsaponifiable Matter in Oils and Fats and of Unsaponified Fat in Soaps

B -P limits for "free fat" in soaps

Analyst, 59 (1934) 104 cf *B* (1933) 434, through *J Soc Chem Ind* 53 (1934) 411B

Vaisman, G

Determination of phenacetin, acetanilide or aspirin

Farm Zhur, 3 (1933), 109–112, through *J Soc Chem Ind*, 53 (1934) 348B

West, Edward F, and Brode Wallace R

The absorption spectra of ferric compounds I The ferric chloride-phenol reaction

J Am Chem Soc 56 (1934) 1037

Wilkinson, J A, *et al*

Analysis of mixtures of oxalic and citric acids by titration with ceric sulfate

Ind Eng Chem 26 (1934) 161

ORGANIC CHEMICALS

Christensen, E V, and Jespersen, J C
Notes on 2,4-dinitrophenol
Arch Pharm og Chem, 41 (1934), 310

Ciogolea, George
Detection of carbon tetrachloride in chloroform
J pharm chim, 19 (1934), 377

Gailliot, M
The composition and solubility of acriflavine and some other derivatives of 2,8-diamino-acridine used in therapeutics
Quart J Pharm & Pharmacol, 7 (1934) 63

Griffith, Ivor
The pharmaceutical applications of sulfonated lauryl alcohol and kindred products
Am J Pharm, 106 (1934), 176

Gubelmann, I, and Elley, H W
American production of synthetic camphor from turpentine
Ind Eng Chem 26 (1934) 589

Herrmann, P
Contribution to the knowledge of resins III Action of ozone on α- and β-amyrin
Arch Pharm, 272 (1934) 607

Kuwada and Matsukawa
Chemical researches on the saponins VIII and IX
J Pharm Soc Japan, No 625 (1934), 32 35

Raymond-Hamet
Color reaction of certain phenylamines
Bull sci pharmacol, 41 (1934), 224

Redgrove H Stanley
Triethanolamine
Chem & Drug, 70 (1934), 475

Tabern, D L, and Volwiler E H
Hypnotics containing the *l*-ethylpropyl group, syntheses with higher esters of *p*-toluene-sulfonic acid
J Am Chem Soc, 56 (1934) 1139

Wagenaar, M
Contribution to the microchemistry of quinine ethylcarbonate
Pharm Weekblad, 71 (1934) 435

Williams, Robert R, *et al*
Larger yields of crystalline antineuritic vitamin
J Am Chem Soc, 56 (1934) 1187

THE SOLUBILITY OF POTASSIUM CHLORIDE IN AQUEOUS POTASSIUM IODIDE SOLUTIONS *

BY S D HARRIS AND W G CHRISTIANSEN

In connection with other studies in progress in this laboratory, it became necessary to determine the effect of varying amounts of potassium chloride on the solubility of potassium iodide in water The determinations were carried out at 20°, 30° and 40° C, and the results are shown graphically in Fig 1 and in detail in the experimental part As was expected, the addition of successively larger quantities of KCl to saturated KI solutions depressed the solubility of each until an equilibrium was reached

In addition the solubility of KCl in terms of grams of salt per 100 cc of solution was determined for the same temperatures

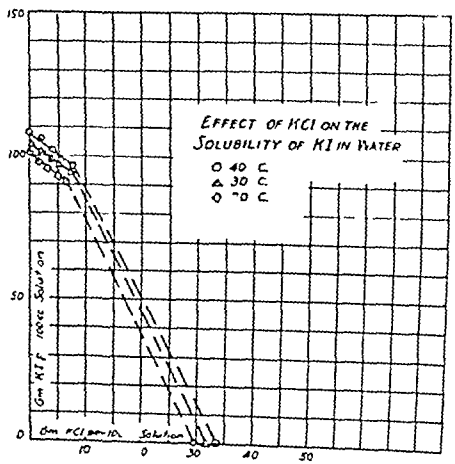


Fig 1

* Section on Practical Pharmacy and Dispensing A PH A, Madison meeting 1933

EXPERIMENTAL

The determinations were carried out in the following manner A saturated solution of pure potassium iodide was prepared at 50° C and cooled to the desired temperature The solution was well stirred to prevent supersaturation and the separated salt allowed to settle Fifty cc of the clear supernatant liquor was pipetted into a large test tube by means of a pipette calibrated at the particular temperature and the desired quantity of KCl ground to 80 mesh added The tube was sealed by a blast lamp and attached to a shaking device in a thermostat maintained at the desired temperature to within ±0 05° C Shaking was continued for 24 hours after which the undissolved salt was allowed to settle Ten-cc portions were then removed by a calibrated pipette and diluted to 1000 cc Total halogen was determined in this dilution by Volhard s method and potassium iodide by KIO_3 solution From these values the composition of the solution in terms of grams of KCl and KI per 100 cc of solution was calculated

TABLE I —KCl-KI-WATER SYSTEM AT 20° C

Gm KCl Added per 100 Cc KI Solution	Cc KIO_3 Used	Cc N/10 $AgNO_3$ Equivalent to KI from Col 2	Gm KI/100 Cc Solution	Cc N/10 $AgNO_3$ Equivalent to Total Halogen	Gm KCl/100 Cc Solution
0	30 20	15 10	100 3	15 06	
	30 20				
2	29 35	14 70	97 4	15 31	1 82
	29 35				
4	28 70	14 35	95 3	15 51	3 47
	28 70				
6	27 80	13 90	92 3	15 59	5 05
	27 85				
8*	27 25	13 63	90 5	15 84	6 60
10	27 35	13 66	90 8	15 92	6 74
15	27 35	13 66	90 8	15 84	6 50
20	27 30	13 63	90 6	15 92	6 81
25	27 30	13 63	90 6	15 92	6 81
Average			90 7		6 69

TABLE II —KCl-KI-WATER SYSTEM AT 30° C

Gm KCl Added per 100 Cc KI Solution	Cc KIO_3 Used	Cc N/10 $AgNO_3$ Equivalent to KI from Col 2	Gm KI/100 Cc Solution	Cc N/10 $AgNO_3$ Equivalent to Total Halogen	Gm KCl/100 Cc Solution
0	31 10	15 54	103 2	15 80	0 78
	31 15				
2	30 30	15 12	100 4	15 85	2 03
	30 30				
4	29 50	14 75	98 0	16 21	4 21
	29 50			16 16	
6	29 20	14 60	96 8	16 46	5 53
	29 20			16 61	
8*	28 25	14 12	93 6	16 77	7 92
	28 20				
10	28 10	14 00	92 8	16 64	7 85
	28 30				
15	28 00	14 00	92 8	16 59	7 74
	28 00				
20	27 95	14 00	92 8	16 59	7 74
	27 95				
25	27 85	13 92	92 4	16 77	8 52
	27 85				
30	27 90	14 00	92 8	16 64	7 29
	27 90				
Average			92 9		7 84

TABLE III —KCl–KI–WATER SYSTEM AT 40° C

Gm KCl Added per 100 Cc KI Solution	Cc KIO_3 Used	Cc $N/10$ $AgNO_3$ Equivalent to KI from Col 2	Gm KI/100 Cc Solution	Cc $N/10$ $AgNO_3$ Equivalent to Total Halogen	Gm KCl/100 Cc Solution
0	32 20	16 10	107 2	16 13	
	32 20				
2	31 40	15 72	104 5	16 40	2 04
	31 40				
4	30 40	15 20	101 2	16 67	4 39
	30 35				
6	29 40	14 70	97 9	16 55	5 55
	29 40				
8*	28 85	14 44	96 2	16 94	7 49
10	28 75	14 38	95 7	17 18	8 39
15	28 80	14 38	95 9	16 88	7 49
20	28 80	14 38	95 9	16 94	7 67
25	28 80	14 38	95 9	17 09	8 12
30	28 7	14 28	95 5	17 08	7 88
Average			95 9		7 86

* These data show that with 8 or more grams of KCl per 100 cc of the KI solution the system is in equilibrium with a solid phase containing both KCl and KI

TABLE IV —SOLUBILITY OF KCl

Temperature ° C	Gm KCl/100 Cc Solution
20	29 74
30	31 88
40	33 98

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES
E R SQUIBB AND SONS
BROOKLYN N Y

A STUDY OF FOWLER'S SOLUTION

BY CHARLES SCHWARTZ, JR *

The fact that Fowler's Solution is subject to deterioration on standing is well known Its alkalinity also has proven to be objectionable in the compounding of many medicines It seems, then, that if the U S P formula could be modified so that the alkalinity would be reduced without causing more rapid decomposition, a more desirable product would result Since moldy growths often develop in the Solution, the addition of a suitable preservative would also serve to improve it

The formula of Fowler s Solution as given in the U S P X is as follows

Arsenic Trioxide	10 Gm
Potassium Bicarbonate	20 Gm
Compound Tincture of Lavender	30 cc
Distilled Water, a sufficient quantity to make	
	1000 cc

* Teaching Fellow College of Pharmacy University of Washington, Seattle

Each hundred cubic centimeters must contain the equivalent of not less than 0 975 Gm and not more than 1 025 Gm of As_2O_3

A résumé of the formulas adopted by foreign pharmacopœias is of interest Chart I represents a comparative study of the principal ones A study of this chart shows (1) that in addition to potassium bicarbonate, the hydroxide and carbonate of potassium are also used, (2) that the majority are more or less alcoholic and (3) that the final products are in some cases nearly neutral, while in others, are alkaline to varying degrees

E M Smelt[1] reports an investigation of the keeping properties of the solution adopted by the British Pharmacopœia The latter solution is of particular interest, in that it is almost neutral in reaction His findings are that (1) the addition of preservatives or the proper adjustment of p_H inhibits the growth of molds, (2) the depositing of crystals can be controlled by increasing the alkalinity or acidity, and (3) the use of sodium hydroxide instead of potassium hydroxide encourages rather than prevents the growth of molds

Although much work has been done on all of these solutions, their diversity in formulas indicates that a product satisfactory in all respects has not yet been attained

CHART I

Title	Arsen Trox	Pot Bicarb	Pot Carb	5% Liq Pot Hydrox	Sp Lav	Tr Lav	Co Sp Balm	Alcohol	Acid Hydrochl Dil	Water Sufficient Quantity to Make
Liquor Potassii Arsenitis U S P 1926	10 Gm	20 Gm				30 cc				1000 cc
Liq or Arsenicalis B P 1932	10 Gm			100 cc					±28 cc.	1000 cc
Liquor Arsenicalis Fowleri	10 p		10 p		40 p				±30 p	1000 p
Netherlands P 1926										
Liquor Kalii Arsenitis Swedish P 1925	10 Gm	10 Gm			10 cc				30 cc	1000 cc
Liquor Kalii Arsenicosi German P 1926	10 p	10 p			30 p			120 p		1000 p
Kalium Arsenicosum Solutum Italian P 1929	10 p	10 p						100 p		1000 p
Solutć D Arsćnite De Potasse French P 1908	10 Gm		10 Gm				30 Gm	120 Gm (90%)		1000 Gm

Abbreviation p = parts

EXPERIMENTAL

In view of the probability that some of the alkali is consumed by the tinctures and spirits commonly added to flavor, color or preserve the solution, it was decided to eliminate such agents, substituting for them alcohol or glycerin, both of which should exert a preservative action Further, since the bicarbonate, hydroxide and carbonate of potassium have all been used, a comparison of the stabilities of solutions made with each seemed worth while

Accordingly, twelve solutions were prepared containing varying amounts of the above-named agents In all cases, the alkali content was reduced below that

[1] E M Smelt, *Quart J Pharm Pharmacol* 6 (1933), 375

officially specified U S P materials were used throughout, the sample of arsenic trioxide available assaying 99 5%, undried The solutions, excepting one, were stored in corked bottles of white glass, not completely filled, since this would best duplicate ordinary dispensary conditions In order to ascertain the effect of storage in well-filled, glass-stoppered bottles, the twelfth was stored in this manner

The solutions were assayed immediately after preparation and subsequently at ten-day intervals, according to the U S P procedure A commercial sample which had been carefully stored for an indefinite period in the original corked bottle of amber glass was also assayed to determine, if possible, just how far the decomposition would proceed The latter solution was the product of a reputable manufacturer and was labeled U S P

CHART II —FORMULAS USED IN PREPARING THE TWELVE SOLUTIONS

Ingredients	No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8	No 9	No 10	No 11	No 12	No 13 *
Arsen Triox	10 Gm	10	10	10	10	10	10	10	10	10	10	10	10
Pot Bicarb			7 6			7 6		7 6	5				20
Pot Hydrox		5			5					3 4			
Pot Carb				6			6				4		
Alcohol		50 cc	50	50				30			50	50	Co Tr Lavend 30 cc
Glycerin	100 cc				50	50	50		50	50			
Dist Water q s	1000 cc	1000	1000	1000	000	1000	1000	1000	1000	1000	1000	1000	1000

* A commercial product labeled U S P hence the U S P quantities are tabulated

CHART III —RESULTS OF ASSAYS MADE EVERY TEN DAYS EXPRESSED AS GM OF As_2O_3 PER 10 CC. ALSO LOSS OF As_2O_3 PER 100 CC IN GM

Sol No	0 Days	10 Days	Total Loss	20 Days	Total Loss	30 Days	Total Loss	40 Days	Total Loss	50 Days	Total Loss	60 Days	Total Loss
1	0 989	0 987	0 002	0 979	0 010	0 972	0 017	0 972	0 017	0 972	0 017	0 972	0 017
2	0 998	0 995	0 003	0 991	0 007	0 991	0 007	0 989	0 009	0 989	0 009	0 989	0 009
3	0 998	0 995	0 003	0 991	0 007	0 991	0 007	0 991	0 007	0 991	0 007	0 991	0 007
4	0 989	0 988	0 001	0 986	0 003	0 981	0 008	0 980	0 009	0 980	0 009	0 980	0 009
5	1 001	0 995	0 006	0 990	0 006	0 993	0 008	0 992	0 009	0 991	0 010	0 991	0 010
6	0 998	0 997	0 001	0 994	0 004	0 994	0 004	0 994	0 004	0 994	0 004	0 992	0 006
7	0 997	0 997	0 000	0 994	0 003	0 994	0 003	0 992	0 005	992	0 005	0 992	0 005
8	0 998	0 997	0 001	0 991	0 007	0 991	0 007	0 991	0 007	0 991	0 007	0 991	0 007
9	1 002	1 001	0 001	0 993	0 009	0 991	0 011	0 991	0 011	0 991	0 011	0 991	0 011
10	1 002	1 001	0 001	0 992	0 010	0 992	0 010	0 992	0 010	0 992	0 010	0 992	0 010
11	1 004	1 002	0 002	0 994	0 010	0 994	0 010	0 994	0 010	0 992	0 012	0 992	0 012
12	0 993	0 989	0 004	0 984	0 009	0 984	0 009	0 984	0 009				
13	0 958	0 958	0 000										

The formulas of the twelve solutions are summarized by Chart II Equivalent quantities of the alkali salts were used taking into account the purity rubric as stated in the U S P, as follows

	K_2CO_3	$KHCO_3$	KOH
Molecular weights	138 21	100 11	56 11
Equivalent weights	138 21	200 22	112 22
Assumed amount of water present	15%	negligible	15%
Corrected equivalent weights	162 6	200 22	132 0

Chart III tabulates the results of the assays together with the loss in trivalent arsenic content in solution Within the first ten day period sedimentation was noted in the two solutions containing no alkali Whereas the sedimentation was marked in these two solutions over the total period of observation, the amount shown by all of the others was negligible The commercial product had a crystalline deposit as well as a small amount of gelatinous residue None had an unpleasant odor

DISCUSSION

The twelve solutions may be divided into two groups according to the total loss of trivalent arsenic within sixty days, as follows

Group I

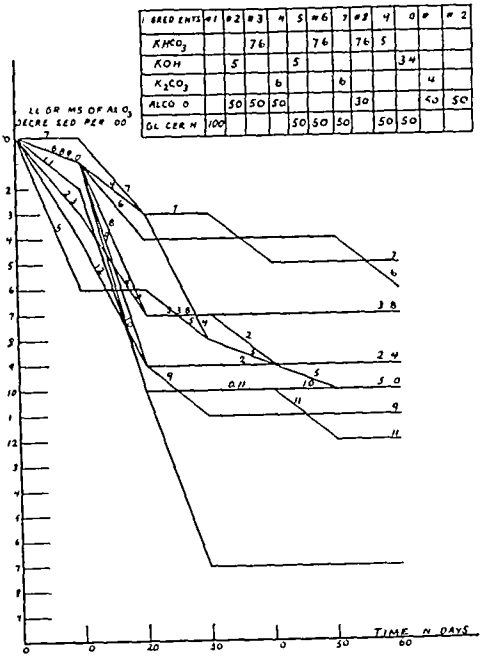
Solution 3—7 mg decrease As_2O_3 per 100 cc
Solution 6—6 mg decrease As_2O_3 per 100 cc
Solution 7—5 mg decrease As_2O_3 per 100 cc
Solution 8—7 mg decrease AsO_3 per 100 cc

Group II

Solution 1—17 mg decrease As_2O_3 per 100 cc
Solution 2— 9 mg decrease As_2O_3 per 100 cc
Solution 4— 9 mg decrease As_2O_3 per 100 cc
Solution 5—10 mg decrease As_2O_3 per 100 cc
Solution 9—11 mg decrease As_2O_3 per 100 cc
Solution 10—10 mg decrease As_2O_3 per 100 cc
Solution 11—12 mg decrease As_2O_3 per 100 cc
Solution 12— 9 mg decrease As_2O_3 per 100 cc

The average decrease in Group I was 6 25 mg , whereas in Group II it was 10 87 mg The conclusion can be drawn here that the solutions of which Group I consists demonstrated the greatest stability over a period of sixty days We find that potassium bicarbonate had been used in the preparation of three of the four solutions in this Group The only other one containing potassium bicarbonate (No 9) showed a total decrease of 11 mg , but inas much as the quantity used had been reduced to a greater extent in this solution, it would indicate that there must be a minimum amount of the salt required to furnish this stability Solution No 7, containing potas sium carbonate and five per cent glycerin, also stood up very well

CHART IV



In the solutions in which potassium hydroxide had been used (2, 5, 10), there was an average decrease of 9 6 mg showing it to be much less efficient than potassium bi carbonate The other two solutions in which potassium carbonate was used (4, 11) showed an average loss of 10 5 mg It is interesting to note that the stable solution using potas sium carbonate contained glycerin while the less stable ones were alcoholic All solutions containing the lesser amounts of alkali or no alkali at all proved to be comparatively less stable

Solution No 12 which had been stored in a well filled, glass stoppered bottle showed a total loss of only 9 mg in 40 days having exhibited no more decrease after 20 days This mode of preservation apparently retarded its rate of decomposition, since it contained no alkali

Very little can be said concerning the advantages of alcohol or glycerin over each other, except as previously mentioned in the case of the solutions made with potassium carbonate The fact is, however, that none of the solutions showed any visible traces of moldy growths, indicating

at this point, that either will function well as a preservative, providing 60 days is sufficient time for the development of a mold

The commercial sample assayed 17 mg of arsenic trioxide below the minimal amount allowed per hundred cubic centimeters by the U S P It had a rather marked sedimentation, partly crystalline and partly gelatinous As stated before, its age was indefinite but its analysis gives us an idea of just how much deterioration can be ultimately expected using the U S P formula Only one of the solutions here prepared fell below the U S P requirement the latter being Solution No 1 which contained no alkali at all

Chart IV compares not only the decreases in strengths, but also the decrease rates It will be noted that the rate is rather great at first, after which a point of equilibrium seems to be reached The amount of air space in the bottle is probably a factor strongly influencing this initial drop A further study of this Chart reveals the following points Solutions Nos 3, 8, 10, 12 all show no deterioration after 20 days, Nos 9 1 none after 30 days, Nos 2, 4 7 none after 40 days, and Nos 5, 11 none after 50 days No 6 apparently has not yet reached a point of equilibrium

CONCLUSIONS

(1) Using equivalent quantities of potassium bicarbonate, potassium carbonate or potassium hydroxide in lesser amounts than indicated in the U S P, solutions may be prepared which do not fall below the official strength within a sixty-day period

(2) The bicarbonate appears to be the most efficient of these three potassium salts in so far as stability of the product is concerned

(3) The percentage of potassium bicarbonate may be advantageously reduced from the present 2 per cent to around 0 76 per cent, a decrease of over 60 per cent

(4) In place of the 3 per cent of Compound Tincture of Lavender now used, about 5 per cent of alcohol or glycerin may be substituted, again providing no mold will appear after 60 days

(5) Dispensers should be urged to make use of small bottles, well-filled and tightly stoppered, for storage purposes This work is being continued

ADDENDUM

Fowler s Solution has been retained in the U S P XI, but it is to be a colorless and flavorless solution Apparently the Compound Tincture of Lavender was objectionable That the alcohol present served a useful purpose has been suggested by various writers

Mr Schwartz was asked to conduct a series of time experiments, the results to date being herewith presented

It is worth while noting that only one of the solutions has deteriorated below the U S P minimum requirement The suggestions offered in previous reports that the extractive in the Compound Tincture of Lavender stimulated oxidation of the trivalent arsenic may be substantiated by Mr Schwartz's report if the solutions have reached a point of equilibrium, and will display no further deterioration The selection of the alkali to be used and the quantity to be used will become a pharmaceutical problem The problem of incompatibility will be a major one — H A Langenhan

AN INTERESTING COLLECTION OF MORTARS *

BY CHARLES H. AND MILLICENT R. LAWALL

Where and when did the mortar and pestle originate as a pharmaceutical utensil? Dictionaries digress in their definitions and encyclopedias entirely omit the subject or dismiss it in a few lines. It seems to be a forgotten or neglected subject, and yet from the crude woodcuts of the early incunabula to the literature of the 19th and 20th centuries, we find the mortar and pestle symbolic of pharmacy. We find actual examples of Arabian and even of Roman mortars but beyond them there lies an impenetrable mystery. We have found no reference to the mortar and pestle in the more ancient Egyptian pictorial writing nor even reference to these implements in the catalog of the British Museum. The translators of the Ebers Papyrus, which gives hundreds of formulas for dozens of kinds of pharmaceutical preparations makes no mention of the mortar and pestle, although they use the terms "casserole," "jug," "hennu-vessel" and "flask" to denote the kinds of apparatus directed.

Many formulas in the Ebers Papyrus call for pills and suppositories, and as the directions to crush or pound are frequently found, it may be that they employed the mortar and pestle, if this is so the fact has been carefully concealed. We know that mortar and pestle-like implements of stone and wood were used by primitive races in both the old and the new worlds for grinding cereals into coarse meal, but we cannot trace the connecting link between this household use and their employment in pharmacy.

When we come to Roman times and customs we find the mortar and pestle in a very advanced form. Whence did it come? Probably not from the Orient, at least not from China, for the Chinese grinding device corresponding to our mortar is still in the form of a boat shaped trough in which a sharpened iron disc is rolled back and forth. Probably the popularity of the electuary and of the medicated fruit pastes called confections gave rise to a need that was quickly filled. Roman mortars have come down to us of marble, earthenware, stone, wood and bronze. The shapes are very much like the mortars of later times. One form of Roman mortar seems to have entirely disappeared, however, from practical use in later times, and is found only as a museum piece. It is the quern or metal mortar with a tightly fitting metal lid which had a hole in the top through which the handle of the pestle could pass. There were earthenware, stone and marble mortars, too, which were mainly employed in the kitchens of the Roman households. This culinary use of the mortar continued down to late Colonial times in America, the metal mortars being used for contusing spices, while the marble mortars were used for making almond paste and similar soft mixtures. The Arabs and Persians used the mortar in pharmacy, probably having learned its use from the Romans. It is toward the close of the medieval period and throughout the Renaissance that we meet the copper, bronze, brass and iron mortars in greatest numbers. The esteem in which mortars were held in pharmacy, and the important position which they occupied is attested by the fact that many of them were inscribed with the date of the origin and

* Section on Historical Pharmacy, Madison meeting, 1933

frequently with the name of the owner and sometimes of the metal worker who made the mortar

Perhaps the introduction of gunpowder into warfare had something to do with the rapid influx of metal mortars, for we learn that the mortars were frequently cast in gun foundries in the 15th and 16th centuries We learn also that bell foundries frequently cast mortars Here were two sources of mortars—diverse and antagonistic It is interesting, too, to note that there was a period covering several centuries when a religious motif seemed to dominate certain phases of pharmacy and medicine It is during this period that we meet with mortars bearing religious mottoes and precepts, such as "Lof Got von all" (Praise God above all) on Flemish mortars, 'En Dieu est mon espoir" (In God is my hope) on French mortars and similar phrases on mortars cast in other lands

The word "mortar" is derived from the Latin word *mortarium*, which is said to have come from the root word "*mordeo*," to bite (which also gives us the word ' morsel") This in turn, may have come from the Sanskrit word "*mrdi* ' meaning to grind or to pound, and which is also used to denote the implement or vessel in which the pounding or contusion may be accomplished

Plato makes mention of the mortar in his writings but whether as a culinary or pharmaceutical utensil, we are not sure Juvenal specifically makes mention of the mortar as an instrument used in the trituration of drugs Pliny also refers to it

The oldest English reference to the mortar in the New Oxford Dictionary, of Murray, is in a Saxon Leech book of about 1000 A D , in which the word is spelled "*morterc* " When we arrive at Elizabethan times we find a contemporary writer commenting at some length on the particular uses to which mortars of different kinds were to be put "Of morters likewise they ought to have divers sorts for all precious stones (that enter into electuaries) and corall ought not to be beaten in a brazen morter, but pearls and corall ought to be beaten in a morter of white marble, precious stones must be made or grinded into pouder upon a stone called in Latine, Lapis Porphirius, which is a kind of red marble Also purgations or electuaries, pills or powders mingled with syrups ought not to be dissolved in brazen morters, but in morters of glasse, of stone or of fine wood, yea, and if they were of silver for great men of high degree, it were best Also some ointments ought to be made in morters of lead "

There is a vessel akin to the mortar and pestle found in South America, called the "*metate*" which consists of a concave stone surface, over which a stone roller, tapering toward both ends is rolled This type of grinding device has also been found in the ruins of the circular huts of the original Britons in North Wales

The Romans had special manufactories for *mortaria* in Britain, from which the wares were exported to Rome and Gaul

The collection of mortars which we are about to describe is at the Philadelphia College of Pharmacy and Science and includes specimens of many types of mortars of various periods and countries, some of them having interesting individual histories as well Let us proceed to discuss them in the order of the accompanying illustrations

No 1*a* and No 1*b* are examples of stone mortars and pestles of American Indian origin The one on the left is very crude, being simply a piece of sandstone, irregular in shape, very crudely hollowed out, the hollow being very shallow The

pestle is a crudely formed piece of similar sandstone The specimen on the right is made from a large pebble, obviously water washed, the hollowed out portion is very regular in shape, and the pestle, which is of a finer grained stone, is well shaped and fits the concavity as well as the average pharmaceutical mortar and pestle fit each other Unfortunately, the geographic locality from which these specimens came is unknown

Figure 2*a* is an example of a lignum vitæ mortar and pestle, machine turned and polished It is about 7 inches tall and about 5 inches in average diameter It is 18th century English

Figure 2*b* is an example of a wooden mortar and pestle, which is reputed to

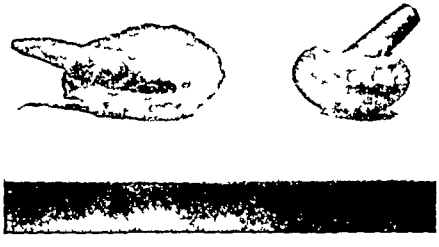


Fig 1 *a*—Crude stone mortar of American Indian origin *b*—Stone mortar of American Indian origin

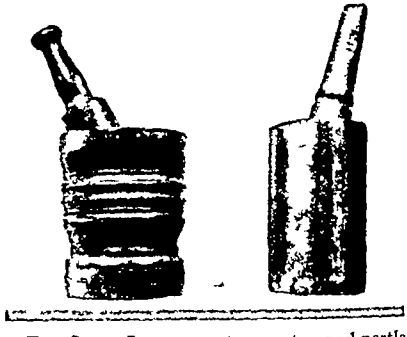


Fig 2 *a*—Lignum vitæ mortar and pestle of English or Colonial origin *b*—Crude wooden mortar of American Indian origin

Fig 3 —Chinese substitute for the mortar and pestle

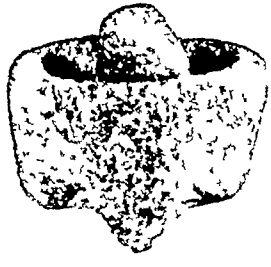


Fig 4 —Stone mortar and pestle from Mexico

have been made and used by a tribe of Shinnecock Indians, whose camp was on Long Island in Colonial days The mortar is crudely formed from a small section of tree trunk of hard wood, and the pestle of hard wood of a different variety

Figure 3 illustrates the Chinese substitute for the mortar and pestle As a contusing and a cutting device, it is excellent, but for triturating it leaves much to be desired

Figure 4 shows a small mortar and pestle of Mexican native origin It is made of very coarse and very hard volcanic rock and is undoubtedly intended for household

purposes probably for grinding the red peppers of which the Mexicans are so very fond

Figure 5 is a very interesting example of a Syrian mortar and pestle, such as is used in Syrian and Arabian households for contusing coffee Coffee is an indispensable adjunct to hospitality in the near East It is served not only at the close of a meal, but also when men meet on business occasions To leave before coffee is served is considered an insult The coffee is always freshly ground in a wooden mortar of this sort, with a very long wooden pestle Both mortar and pestle are beautifully decorated by wood carving inlaid with light colored pigment A shallow-bowled brass spoon for removing the coffee from the rather shallow and narrow hollow in the mortar, is attached to the mortar by a brass chain In this particular specimen the Arabic inscription on the spoon is of more than passing interest Translated, it reads "Made by planter Abi Kovzaza, May 27, 1327 "

Figure 6 is an example of a mortar carved from alabaster, which is a fine-grained form of calcium sulphate It is in an unfinished condition, and is probably intended for ornamental purposes rather than practical use

Figure 7*a* is an example of a marble mortar of the Colonial household type, dating from the 18th century Its companion, 7*b* is a smaller mortar of the same style These marble mortars are sometimes found of a very large size, large specimens occasionally weighing more than 100 lbs

Figure 8 is an illustration of a Chinese mortar and pestle made of porphyry It is of a very unusual shape, being oval, about ten inches long and nearly four inches high Both mortar and pestle are of a brownish pink color and beautifully polished No definite date can be assigned to this mortar, but it is probably very old The mortar and pestle are probably made from different lots of porphyry, as the grain and color of the two pieces are slightly different

Figure 9 is a bronze pestle, very much corroded, which was found among some Roman relics unearthed in a street in Liverpool, England, some years ago It is probably the oldest specimen in the collection, but its shape is identical with that of pestles made nearly two thousand years later

Figure 10 is an unusual specimen of a mortar and pestle of solid ivory, beautifully turned and polished, and is said to be of Spanish origin, and to date from the 16th century It was probably used as a "cosmetic" mortar

Figure 11 shows two very interesting specimens, both of Arabic origin That on the left came from a collection of mortars once owned by Enrico Caruso, the great tenor It bears the following inscription in Arabic "Made by Mohammed Kaghen 1570, and presented to Mohammed Bafr " This mortar is of iron or steel Its companion (*b*) on the left is of copper, with a long-handled, flat-headed copper pestle, both mortar and pestle are very much corroded This specimen is said to have been found in a well at Damascus, and dates from the period of the Crusades, or even earlier It is equipped with a ring handle, the ring being frequently found on Arabic or Moorish mortars, furnishing a convenient method of carrying the mortar, when traveling by caravan

Figure 12 is that of a bronze Arabic mortar, with very fine decorative tooling and an inscription in Arabic, which reads as follows when translated "The owner of blessedness and gifts, Abbas Odesansen, member of Almic Usac, 1226 " There is also on another part of the mortar, the name of a woman—"Sahi Bet Ali," who was

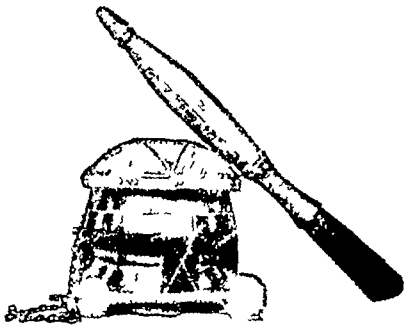


Fig 5 —Syrian coffee mortar dating from the 14th century

Fig 6 —An alabaster mortar and pestle unfinished

Fig 8 —A Chinese mortar and pestle of pink porphyry

Fig 7, *a*—A marble mortar of the Colonial" household type *b*—A marble mortar of the Colonial" household type

Fig 9 —A bronze pestle of Roman origin discovered in England

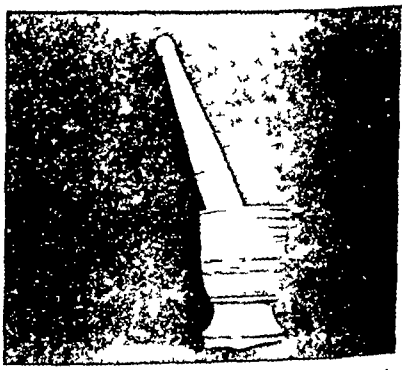


Fig 10 —A carved ivory mortar and pestle of Spanish origin

probably the original owner It was purchased by a collector who brought it from Palestine

Figure 13 is an illustration of a bronze mortar, with very fine inlaid decorations in a lighter colored metal The shape of the mortar is very unusual The inscription appeared to be in Arabic, but proved to be neither Arabic, Turkish, Syrian or Persian The inscription was outlined in white pigment and photographed, and

the photograph sent to Constantinople, where it was deciphered The report on it was as follows "The inscription is in the dialect of a certain Persian sect of fire worshipers (Alevy), and the translation is 'A mill made of a thousand stones' No definite date can be assigned to this mortar, but it is probably very old An expert who saw this mortar says that it is certainly of an origin not later than the 13th century, and may be much older "

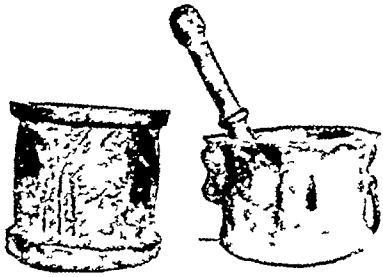


Fig 11, *a*—A 16th century Arabic mortar once owned by Caruso *b*—A bronze Arabic mortar and pestle dating from the time of the Crusades

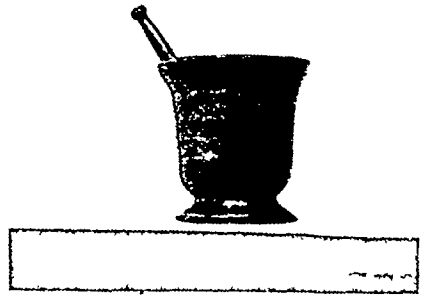


Fig 12 —A bronze mortar from Palestine with an Arabic inscription Dated 1226

Fig 13 —Bronze Persian mortar, with in laid inscription Probably not later than the 13th century

Fig 14 —Ornamental mortar made of an thracite coal

Figure 14 is an ornamental mortar made of anthracite coal, highly polished

Figure 15*a* is an illustration of a bronze mortar of the late 18th century of either Russian or Polish origin

Figure 15*b* is an early American bronze mortar and pestle Figure 15*c* is a brass mortar and pestle of German origin, probably 18th century

Figures 16*a* and 16*b* are both 17th century Spanish mortars

There are a number of Spanish mortars in the collection, most of them beautifully decorated The Spanish mortars are distinctive in their being shallow and having vertical ribs or decorative ridges, and in the absence of handles, except in a few instances where ring handles are found Figure 17*a* is a bronze mortar and pestle of Russian origin, probably dating from the 18th century Figure 17*b* is that

of a beautifully decorated Italian mortar, the unsymmetrical location and size of the handles is noteworthy in this specimen

Figure 18*a* is a bronze mortar from Toul, France, dating from the 16th century,

Fig 15 *a*—An 18th century bronze Russian or Polish mortar *b*—An 18th century bronze American mortar *c*—An 18th century brass German mortar

Fig 16 *a*—A 17th century bronze Spanish mortar *b*—A 17th century bronze Spanish mortar

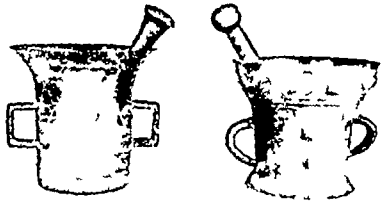


Fig 17, *a*—An 18th century bronze Russian mortar *b*—A bronze Italian mortar probably 17th century

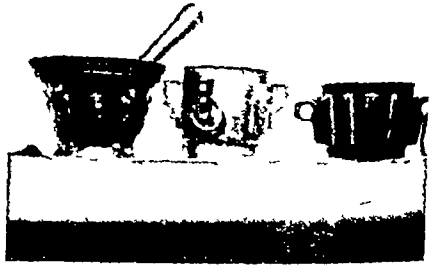


Fig 18 *a*—Bronze mortar and pestle from Toul France, 16th century *b*—Brass Persian mortar with ring handle 14th century *c*—Bronze Spanish mortar 17th century

Fig 19—Brass mortar with dolphin handles and T-handled pestle, dated 1689

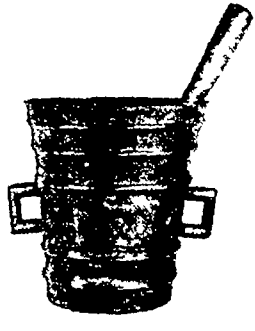


Fig 20—Iron mortar and pestle with square handles, dated 1726

Fig 18*b* is a rare type of Persian mortar of brass, distinctively and handsomely etched, with the ring handles usually characteristic of mortars of Arabic origin It is said to date from the 14th century Figure 18*c* is that of a very early Spanish mortar showing the typical vertical ridges, and the Moorish influence in the ring handles

Figure 19 is that of a brass mortar with dolphin handles, bearing the initials "I B B Z," and the date 1689 It was brought from Switzerland some years ago The T shape of the pestle handle is unusual in this specimen Figure 20 is that of

Fig 21—Wedgwood mortar and pestle, used in store of Christopher Marshall Philadelphia, before the Revolutionary War

Fig 22—Iron mortar, 1784, formerly used in the pharmacy of Frederick Brown, Philadelphia

Fig 23, *a*—Dutch bronze mortar with dolphin handles, dated 1638 *b*—Dutch bronze mortar with dolphin handles, dated 1607

Fig 24—Dutch bronze mortar without handles Dated 1638

an iron mortar and pestle, with square handles, bearing the date 1726 This is either of Russian or Polish origin Figure 21 is an illustration of a wedgewood mortar and pestle, which was used in the store of Christopher Marshall in Philadelphia, before the time of the Revolutionary War

Figure 22 is an illustration of an iron mortar and pestle, bearing the date 1784 painted on the side It came from the pharmacy of Frederick Brown which was originally located at Fifth and Chestnut Sts in Philadelphia Frederick Brown was one of the founders of the Philadelphia College of Pharmacy and Science, and was

originally an apprentice in the store of Charles Marshall, the first president of the College, and the son of Christopher Marshall just referred to

Figures 23*a* and 23*b* are of two bronze mortars of 17th century Dutch origin They were cast by the same workman or foundry, for 23*a* bears the inscription "Henryk Horst me Fecyt, Ao1638," while 23*b* bears in the inscription "Heinrick ter Horst me fecit, Anno 1607 " Both mortars are elaborately decorated and have handles in the form of dolphins Figure 24 is a third mortar coming from this same foundry It bears a similar inscription with the date 1638, but unlike the two previous specimens it has no handles

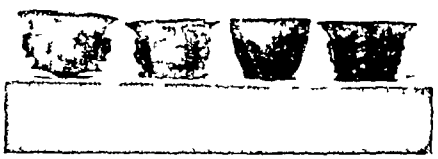


Fig 25, *a*—A 17th century bronze Spanish mortar *b*—A 17th century bronze Spanish mortar *c*—An early American mortar of unusual shape *d*—A 17th century bronze Spanish mortar

Fig 26, *a*—A cylindrical iron mortar with molded decorations originally in the Neergaard Pharmacy, New York *b*—A graceful urn shaped iron mortar from the Neergaard Pharmacy New York

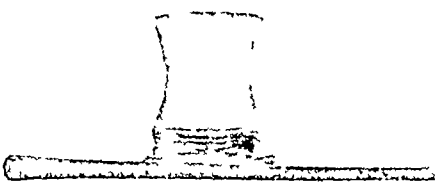


Fig 27 —Large iron mortar with unusually long pestle Early American with an interesting Philadelphia history

Fig 28 —Large bronze mortar bearing date 1733 with reversible pestle

Figures 25*a*, 25*b* and 25*c* are bronze mortars of the 17th century of Spanish origin Specimen *a* has the letter M repeated four times in the decorations The bottom of this mortar had evidently been worn through, for it has a new bottom riveted in place Figure 25*c* is an iron mortar probably of American origin Figure 26*a* and 26*b* are examples of early American iron mortars, *a* has a decorative design which is unusual on iron mortars, *b* is of a graceful urn-like shape, distinctive of mortars made in Colonial America Both of these originally came from the Neer

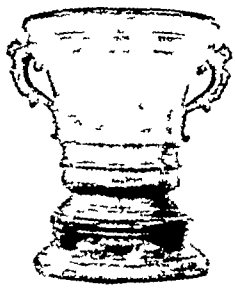


Fig 29 —Very large bronze mortar finely decorated dated 1704

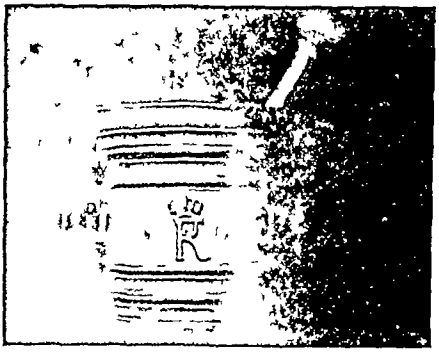
gaard Pharmacy in New York, now owned by Mr David Costelo, to whom the College is indebted for the majority of the mortars described in this article

Figure 27 is also that of an early American iron mortar of unusual shape and with a pestle of unusual length, the mortar being but 11½ inches high This mortar is known to have been used by the following apprentices and clerks in the pharmacy located at Third and Poplar Sts , Philadelphia G W Bley, 1840, John Bley, 1844, Alex Bachman, 1848, Samuel Gerhard, 1849, Jacob H Smith, 1853, Valentine H Smith, 1853, Emil Herwig, 1854 During this period the proprietor of the pharmacy was George K Smith In 1856 the mortar was in the possession of John Ziegler, wholesale and retail druggist at Second and Green Sts , Philadelphia In this same year Ziegler became associated with Valentine H Smith, the firm name being Ziegler and Smith In 1865 the firm name was changed to Valentine H Smith & Co , and from that year until 1929, when this firm was merged with Smith, Kline and French Co , a number of well-known pharmacists in Philadelphia took their turns in using this mortar and pestle during their respective apprenticeships Among these were Walter V Smith, late president of the Smith, Kline and French Co , and Howard E Smith, and Henry S Godshall of the same Company No 28 is a handsome bronze mortar bearing the inscription "Soli Deo Gloria, Amsterdam A° 1733 "

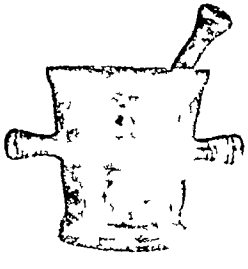
No 29 is a very large mortar, weighing nearly 150 pounds It is very grace-

Fig 30 —Finely decorated bronze mortar with seated lions on handles and bearing the coat of arms of the Medici

ful in shape and is elaborately decorated The handles are in the form of winged angels It is covered with elaborate scroll work, consisting of wreaths and angel heads It bears the following inscription "Filii Francisi de forinis pharmacis parandis fundendum curarunt A S MDCCIV" This mortar was donated by Mr Horatio N Fraser of New York No 30 is a very unusual specimen, also donated by Mr Fraser It is of bronze with a glossy black patina The handles are unlike those usually seen, being horizontal supports for seated lions The design is that of a heraldic shield with a cherub on each side jointly holding a wreath over



Figs 31 and 32 —Obverse and reverse of large brass mortar formerly owned by Frederick the Great



Figs 33 and 34 —Obverse and reverse of bronze mortar elaborately decorated, formerly owned by Napoleon's pharmacist

the center The coat of arms is that of one of the numerous branches of the Medici family

Figures 31 and 32 are the obverse and reverse of a large brass mortar and pestle which was once the property of Frederick the Great, or used in his imperial pharmacy The front bears the imperial monogram of "Friederich Rex," surmounted by a crown The opposite side bears the date 1767, and the stamped inscription "K No 1" which was probably an inventory number This mortar has an interesting history During the World War the German government seized all brass for use in making munitions A collection of mortars was seized just prior to the close of the war Shortly after the war a large lot of all kinds of brass ornaments and untensils was offered for sale in New York, including some very fine

mortars, and among them was this one, which was purchased by David Costelo of New York

Figures 33 and 34 are the obverse and reverse views of a veritable museum piece It is a bronze or bell-metal mortar and pestle which belonged to one of Napoleon s apothecaries The inscription around the top is as follows "A Besançon-Beillemand-Pharmacien-Drogiste" Below this are laurel wreaths and imperial eagles Below these is the name "Napoleon Empereur" Further below this are more laurel wreaths and robed figures There is a double-ended pestle bearing the date "Anno 1802" elaborately engraved in bas-relief

This mortar was at one time in the Rodman Wanamaker collection of Napoleana The donors of the specimens just described are as follows No 4, Wm L Cliffe, '84, vice-president of the College Nos 7*a* and 7*b*, former president, Howard B French, '70 No 9, Joseph P Remington, '66, one of America's pharmacists, and former dean of the Philadelphia College of Pharmacy and Science No 14, Ellerslie W Davis, '16 No 20, George B Evans, '80, former member of the Board of Trustees of the College No 27, Walter V Smith, '87, former member of the Board of Trustees of the College No 28, Horace B Taylor, '57 Nos 29 and 30, Horatio N Fraser, '72, former member of the Board of Trustees Specimens 2*a*, 2*b*, 5, 6, 8, 10, 12, 13, 15, 15*a*, *b* and *c*, 16*a* and *b*, 17*a* and *b*, 18*a*, *b* and *c*, 23*a* and *b*, 25*a*, *b*, *c* and *d*, 26*a* and *b*, 31–32, 33–34, were all donated by David Costelo, '79, of the Neergaard Pharmacy of New York There are not many large collections of mortars in the United States, the largest collection at present being the one owned by E R Squibb & Sons There is no collection to our knowledge, however, which possesses so many diversified, interesting and valuable mortars as the one we have herein attempted to describe

---

ABSTRACTS OF PAPERS PRESENTED BEFORE SECTION ON PRACTICAL PHARMACY AND DISPENSING, A PH A, WASHINGTON MEETING 1934

The Extemporaneous Preparation of Intravenous Solutions Saline and Dextrose," by Robert S Fuqua

The paper submitted attempts to outline simple procedures for the preparation of satisfactory intravenous solutions containing such substances as Sodium Chloride Sodium Citrate and Dextrose

Beginning with the distilled water required, and emphasizing the necessity for purity of, and absence of bacterial contamination in this solvent, the relatively simple matter of making solutions considered and then stress the importance of proper filtration to insure freedom from mechanical impurities—especially filter paper shreds

The thought in mind is to outline both the usual pharmaceutic procedure of preparing simple solutions, with filter paper being used as the filtering medium and also a hospital method for preparing buffered solutions in small lots using the Berkefeld candle type filters to clean

Sterilization and the temporary preservation of sterile solutions, are discussed briefly The need for having such solutions as nearly neutral as possible is noted, and attention is directed to factors which affect the values of same adversely

A Note on the Assay of Reduced Iron by Margarethe Oakley and John C Krantz Jr

A comparison of the mercuric chloride and copper sulphate methods for the determination of reduced iron has been studied

---

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note Shall the pharmacist go after the dental prescriptions? By all means The following paper by Professor Schicks tells how it may be done and also tells how we may prepare our students to serve the dental profession It is worthy of careful perusal by all faculties of colleges of pharmacy —C B JORDAN, *Editor*

SHALL COLLEGES OF PHARMACY TEACH DENTAL PHARMACY?

BY GEORGE C SCHICKS *

The extension of the time period and the enlargement of the scope of course content in the present-day training of the student of Pharmacy stands as mute evidence of what has been uppermost in the minds of pharmaceutical educators College courses have not been lengthened from two years to four nor course subjects doubled that the graduate in pharmacy might say, "I have attended college four years," nor has this change come about for the purpose of increasing the prestige of the profession of pharmacy

No one will question the fact that professional prestige follows close upon increased training, a firmer scientific background and a greater adaptability in fields closely allied with pharmacy But pharmaceutical educators have not thought first of professional prestige Colleges of pharmacy have been scientific pioneers in professional usefulness To such an end have their faculties shaped courses to widen the scope of the professional activities of their graduates Professional usefulness must be the key-note of every pharmacy curriculum Professional usefulness must be the pattern from which every basic scholastic activity of a college is fashioned Professional usefulness must be first, last and uppermost in the minds of educators in our colleges, it must be—nothing else can be substituted, for professional usefulness is the salvation of Pharmacy

It is fast becoming a reality that the man in pharmacy who can divorce himself most completely from the soda fountain, the cigar case, the cosmetic counter and the sandwich grill, is the man who has narrowed his competition to the minimum May I say again—he alone among the keepers of shops is licensed by law to compound prescriptions That has been the key-note of his training and his professional prestige will increase with his professional usefulness

Each year splendid groups of fine young men and women leave our colleges of pharmacy—young people whose eyes have seen scientific wonders under microscopes, whose fingers have held tubes while scientific miracles have gone on within those glass containers, whose hands have stained slide after slide, that those eyes might behold the giants of disease which stalk among men Are those young people going to give up their test-tubes and mortars and microscopes to make sodas or ham sandwiches?

Of course, they aren't Those young people have caught the spirit of science. The spirit of science has captured them They are the products of our colleges

* Rutgers University

in the minds of whose faculties has been uppermost the ideal of professional usefulness

It is this ideal of professional usefulness which is prompting me, a teacher in a college of pharmacy, to urge the association of colleges to emphasize the subject of dental pharmacy Colleges are the scientific pioneers for professional usefulness and dentistry represents a large field for the prescription pharmacist

There are some very definite reasons why dental pharmacy provides a fertile field for professional activity Uppermost, perhaps, is the earnest desire of the dentists of this country to learn more about official drugs and preparations and the prescribing of them Their enthusiasm and cooperation have been more marked than one dared even believe they could be Here is a field where professional pharmaceutical usefulness is welcomed In the few years that I have been engaged in this work, more than a thousand practicing dentists have given me their names and addresses requesting that they be kept informed regarding recognized and approved drugs and preparations Letters have come unsolicited from outstanding dental educators and officials, encouraging us in our work and assuring us of their cooperation

It has always been the privilege of the pharmacist, authorized by licensure, to serve the medical profession in all of its special branches Dentistry represents the second largest field for prescription writing and therefore widens the scope of professional service

Our student pharmacists need some training with regard to the needs of the dental profession Much professional usefulness would be sacrificed if the service rendered is not an intelligent one

The writing of prescriptions is a comparatively new field for the dentist It must be remembered that the training of most dentists and of many physicians has been lacking in prescription writing Colleges of dentistry recognize this deficiency and are strengthening their courses in Materia Medica and the prescription The student pharmacist should be encouraged to develop an attitude of understanding and helpfulness Ridicule of prescriptions will do much to retard cooperation between the dentist and pharmacist

Some pharmaceutical supply houses have always made prescription writing as easy as possible for all branches of the medical profession These houses are supplying dentists and physicians with prescriptions which in reality amount to nothing but a notation in good legible printing of a substance to be purchased at a drug counter, the patient to follow either the directions given on the bottle or package or those printed on the prescription Such a practice robs the dentist of individuality in his prescriptions, encourages self-medication and discourages the use of any products other than the packaged type

It would seem, then, that the student pharmacist should be thoroughly trained in Latin prescription writing College courses in prescription writing should be so strengthened to assure adequate training An accurate and brief method of writing prescriptions should be so outlined to the student that he could make helpful suggestions to the dentist when discussing prescription problems with him

Charters, in his "Basic Curriculum Materials," mentions "Agents Acting on the Teeth and Gums," and totals them as numbering 121 substances In a small booklet published by the N A R D , entitled "Official Drugs and Preparations

Used in Dentistry," there are listed some 230 drugs and preparations official in the U S P and N F A study of these items will reveal the many opportunities open to the pharmacist to supply these materials to the dental profession At the present time a wide field for professional usefulness is lost to the manufacturers of dental supplies, for they are the only ones who are going after the business It is their salesmen who supply practicing dentists with the information they get regarding the drugs they use in their practice

Dentists in their practice use many of the same drugs and preparations used by the physicians, but unless such facts are pointed out to the student, he may pass them by with no thought as to their dental application The teachers of Pharmacy, Materia Medica and Bacteriology should emphasize such drugs and preparations when they are studied in these courses and point out their special application to dentistry

The questions now arise as to how and where in the pharmacy curriculum should dental drugs and preparations be considered and how much time should be allowed for this work?

It seems that a suitable place for the study of such drugs would be in the lecture and laboratory of Materia Medica or Pharmacology, Dispensing Pharmacy and Bacteriology For instance, when the pharmacology of iodine is being considered, its use in dentistry should be mentioned, stressing the reasons for its use, the preparations commonly used, which may differ some from the U S P and N F formulas but which contain official materials—whether or not it produces a permanent stain on the teeth, how such may be removed and the strength and solvents of iodine preparations used in the mouth, etc Not only the antiseptic and germicidal value in the oral cavity should be considered but also its use in solutions such as a disclosing agent The combination of iodine with other substances such as zinc chloride, potassium iodide, glycerin and water for this purpose should be noted

It may be necessary to add a few new terms to the student's vocabulary, as in the uses of iodine as a "disclosing agent" and antiseptic and counter-irritant in the treatment of pericementitis Attention should be brought to the fact that dentists usually use a weaker solution than the approximate 7% U S P strength tincture Those classes and combination of drugs used more commonly in dentistry, such as abrasives, obtundents, devitalizing agents, varnishes, etc, may be studied at some convenient time during the lecture and laboratory periods

In dispensing pharmacy the student may be required to dilute the U S P tincture of iodine with equal parts of glycerin, making a strength commonly used in dentistry—a strength not likely to cause severe irritation and one more readily uniting with the mouth secretions To increase student technique, such a solution could be placed in glass ampuls—not that this has any special application to dentistry, but it would show how ampuls are filled and focus attention to the 3 5% iodine ampuls in the N F

In the same course, students should compound prescriptions used by dentists in office practice, and those written for patients Characteristic prescriptions may be obtained from the files of local pharmacists and students could be asked to bring in dental prescriptions Stock solutions and preparations which the dentist uses in his own office but does not usually prescribe should be made by the

student For example, Talbot's Iodo-glycerol Solution, scouring powders, colored and flavored, obtundent solutions, digestive solutions or pastes for removing dead pulp or extraneous tissue, varnishes, disclosing refrigerant and counter-irritant solutions The kinds of, and uses, for various abrasives and polishing agents found in tooth powders and pastes, such as precipitated and prepared chalk, tricalcium phosphate, tin oxide, pumice, magnesium carbonate, soap and others, should be referred to and their combinations studied and experimented with

Tooth powders and pastes should be made by the student, using the above substances and others The preparation of tooth-paste base should be given as an experiment The formula for such a base appears in the September 1932, issue of the *Druggists Circular* and the February 1933, issue of the A PH A JOURNAL To this base, medication may be added upon prescription by the dentist A similar experiment could be performed with vehicle mouth rinses

The coloring and flavoring of substances such as sodium perborate should be considered There is little excuse for requiring a patient to take ill-smelling or tasting medicaments There are some substances, the flavoring of which might be experimented with by some especially interested students who are qualified to carry on the work, for instance, the preparation of a palatable solution of copper sulphate or chromic acid

Since the lecture and laboratory work in dental pharmacy is not widely different from that usually studied in most pharmacy courses, a minimum of 10 hours of laboratory and 3 hours of lecture could be used to advantage in dispensing pharmacy In bacteriology, when the antiseptics and germicidal power of certain agents are studied, special reference to dental use could be made The germicidal claims of mouth washes and tooth pastes could be checked and compared, thus giving the student valuable information to discuss with the dentist Attention could be brought to the fact that certain tooth pastes no longer bear the word "antiseptic" on the tube and some manufacturers of mouth washes have changed their dilutions to make claims more nearly true In courses such as Materia Medica and Bacteriology special reference to the dental application of drugs and preparations should be mentioned as the drug is brought up for consideration

Stress should be placed on the rulings of the Council of Dental Therapeutics of the American Dental Association, governing the acceptance of the drugs and preparations analyzed by its laboratory Student pharmacists should be shown the wisdom of encouraging the use of non-secret dental preparations and preparations accepted by the Council

At the present time there is not a publication known as "Accepted Non-Official Dental Remedies," although one is in preparation, and it is therefore necessary to get such information from the *Journal of the American Dental Association* Permission has been granted me by the American Dental Association to publish in a pharmaceutical journal the list of accepted and rejected dental preparations This information, it is believed, will be invaluable to the practicing pharmacist

It will require extra effort on the part of the teacher to compile the necessary information regarding the drugs used in dentistry, as well as the arrangement of the laboratory experiments, but the work will be found most interesting and exceedingly worth while

The following prescriptions may give some idea of the nature of the work

℞	Iodine	3 50 Gm
	Potassium Iodide	1 20 Gm
	Zinc Chloride	1 00 Gm
	Glycerin	25 00 cc
	Distilled Water	25 00 cc

Sig Disclosing solution to be used by dentist

℞	Zinc Chloride	1 00 Gm
	Solution Formaldehyde	0 25 cc
	Menthol	0 25 cc
	Oil of Cinnamon	0 50 cc
	Oil of Clove	0 50 cc
	Alcohol	25 00 cc
	Distilled Water to make	100 00 cc
	Tincture of Cudbear to color	

Sig 4 cc in half glass of water as mouth rinse

℞[1]	Iodine	20 00 Gm
	Phenol	60 00 Gm
	Glycerin	20 00 Gm

Sig To be used by dentist as a caustic

℞[2]	Pepsin	7 50 Gm
	Diluted Hydrochloric Acid	0 50 cc
	Glycerin	7 50 cc
	Alcohol	1 00 cc
	Menthol	0 05 Gm
	Eucalyptol	0 05 cc
	Methyl Salicylate	0 05 cc
	Distilled Water to make	100 00 cc

Sig Digestive solution for extraneous tissue

℞[3]	Camphor	47 5 Gm
	Menthol	47 5 Gm
	Alcohol to make	100 0 Gm

Sig For facial neuralgia

℞[4]	Rosin	20 00 Gm
	Chloroform	100 00 cc

Sig Varnish in dental work

℞	Ethyl Aminobenzoate	10 0 Gm
	Balsam Peru	15 0 Gm
	Glycerin	20 0 Gm

Sig For painful socket

℞	Arsenic Trioxide	Gr LXXX
	Cocaine Hydrochloride	Gr XV

Oil of Clove to make a paste

Sig Devitalizing paste

The college teacher can find many outstanding books which will give him great assistance in outlining his work Such books as the following will be found in valuable

Prinz, 'Dental Materia Medica and Therapeutics" C V Mosby, St Louis

Prinz, "Dental Formulary," C V Mosby St Louis

Buckley, 'Modern Dental Materia Medica, Pharmacology and Therapeutics," Blakiston Philadelphia

Harris, "Dictionary of Dentistry," Blakiston, Philadelphia

Fones, "Mouth Hygiene" Lea and Febiger, Philadelphia

Fisher and Riethmuller "Local Anesthesia in Dentistry," Lea and Febiger Other reference books will be found listed among the dental textbooks of catalogs presented by publishers of scientific books

Rutgers University College of Pharmacy has endeavored to stimulate a national interest in pharmaceutical service to the dental profession Several colleges of pharmacy are now engaged in this important and helpful work The undertaking is too great and the scope too national in character for any one college to undertake I should like to urge the Association of Colleges to foster the opportunity which dental pharmacy offers for increased professional usefulness I should like to ask them to again be pioneers in a field which offers so many possibilities for their graduate students

[1] PHENOL IODATUM N F

[2] LIQUOR PEPSINI ANTISEPTICUS N F

[3] MENTHOL CAMPHORATUM N F

[4] SOLUTIO RESINÆ CHLOROFORMICA N F

NOTE Many dentists use twice the amount of rosin in the same amount of chloroform

THE EIGHTY-SECOND ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, WASHINGTON, D C , MAY 7–11, 1934

ABSTRACTS OF THE MINUTES OF THE GENERAL SESSIONS

Sessions of the Eighty-Second Annual Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION were held in Shoreham Hotel, but it was necessary to hold several of the sessions in Wardman Park Hotel A list of members in attendance may be found on pages 519–521 of the May JOURNAL

Some of the Committee Reports referred to in the Proceedings have been printed in the Council Minutes, pages 504–514 of the May JOURNAL, some are included in these minutes or will be printed in later issues of the JOURNAL under 'Committee Reports" or under Addresses "

FIRST GENERAL SESSION

The First General Session of the Eighty Second Annual Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION was called to order by President R L Swain in the Theatre of Wardman Park Hotel, May 9th at 8 15 P M The following former presidents of the AMERICAN PHARMACEUTICAL ASSOCIATION were in attendance (In order of seniority) James H Beal, E G Eberle, William B Day, Frederick J Wulling, Charles H LaWall, Samuel L Hilton, Julius A Koch, H V Arny C W Holton, L L Walton, Theodore J Bradley, H A B Dunning, H C Christensen Walter D Adams, W Bruce Philip (The Dedication Exercises of the American Institute of Pharmacy are reported in the May JOURNAL, pages 478–490 The annual banquet is reported on pages 490–498 of the same issue)

It was explained that this was a joint meeting with the House of Delegates and that after the presidential address the meeting would be turned over to the Chairman of the House of Delegates

Vice-President Robert P Fischelis presided while President R L Swain read his presidential address which was received with due appreciation by the members present (See Address on pages 438–454 and Resolutions on pages 474–476)

Vice President Robert P Fischelis announced that in accordance with the usual order this comprehensive, splendid address would be referred to the Committee on Resolutions

James H Beal was recognized He commented favorably on the address of President Swain and stated that the ASSOCIATION had been honored by his dedicatory address and that of this evening In making a presentation the speaker stated that one of the projects of great hope in connection with the American Institute of Pharmacy is the museum of Historical Pharmacy He desired the privilege this evening of being not the first but one of the first to present an historic relic, a genuine madstone Back in the sixties and seventies of the last century, a madstone was known as a peculiar mineral substance which when applied to the bite of a mad dog had the magic property of extracting the virus He presented a genuine madstone, not an imitation—there were fraudulent as well as genuine madstones and he has the authentic record of this for one hundred years It comes down to us from four generations of pioneer physicians, practicing in Southwest Georgia and in the wilds of Northwest Florida

This stone has the authentic record of four cures complete cures of the bite of a mad dog He humorously explained the results of the application but maintained that the properties of the madstone are as fully authenticated as that of some alleged remedial agents

This particular substance or magic amulet has been known all over the world for hundreds of years but only in the United States so far as he knew, has it been called a madstone In European and Asiatic countries it has been known as a bezoar He requested Charles H LaWall author of ' Four Thousand Years in Pharmacy " to tell a little of the story of the bezoar The account given by the latter was received with great interest and will be made the subject of a brief historical paper in a later issue of the JOURNAL Professor LaWall concluded by saying that the bezoar is a substance of particular interest in a museum such as is being established by the AMERICAN PHARMACEUTICAL ASSOCIATION

President Swain thanked the donor for the gift and Dr LaWall for his presentation and accepted the bezoar thankfully for the ASSOCIATION Congratulatory greetings conveyed by cablegrams and telegrams were read from the following Dr José Guillermo Diaz Havana, Dr William Mair, Newcastle on Tyne, Harvey J Donnell North Pacific Branch A PH A, Samuel W Fraser Drug Chemical and Allied Trades Section, New York Board of Trade, J J Lynch, Oregon State Pharmaceutical Association, Portland Retail Druggists Association, Louis Ruvin Northern Ohio Druggists Association, David Hooper, London, England, Herbert Skinner, London England Wheeler Sammons Drug Institute of America, Inc , British Pharmaceutical Society (see page 477, May JOURNAL)

The meeting was then adjourned

SECOND GENERAL SESSION

The Second General Session of the AMERICAN PHARMACEUTICAL ASSOCIATION was convened in Shoreham Hotel on Thursday, May 10th at 2 00 P M by President R L Swain A message was received from Honorary Member F Gladstone Hines of London, congratulating the ASSOCIATION and greeting the members

The report of the House of Delegates, covering the first and second sessions was read by Secretary Kelly and approved

Julius Riemenschneider, of Chicago, was recognized by President Swain He presented a London Pharmacopœia of 1673 on behalf of Wheeler Sammons for the Drug Institute of America

President Swain thanked the donor for this evidence of friendship and assured him that the gift would find a permanent place in the American Institute of Pharmacy

The minutes of the First General Session were read and approved

Secretary Kelly referred to a number of congratulatory messages which had been received

Chairman H A B Dunning in speaking for the Headquarters Campaign Committee said he would make no extensive report but summarize what had been done during the past year, many things that might appear in his report are part of the Secretary's report He said in part

'There have been five thousand subscriptions from wholesalers, retailers and manufacturers and students In all there has been collected $507 744 95 All of that money has been spent for the site, the erection of the building the furnishing of the building, the landscaping and the gardening A little bit more than that has been spent A very small sum, $35,000 will cover our deficiency That doesn't mean that we are in any danger or that we have a big mortgage on our institution It is a very small one which you and others will clear off within a very short time, whether you know it or not

'I have told you in my other reports that every state in the Union has subscribed to this project, without exception and some countries besides our own, including England, Canada and Porto Rico You will be interested to know that the retailers with their smaller subscriptions have contributed their full part of this fund The retailers subscription has aggregated $232 203, and they have paid a very large percentage of their promises The manufacturers have subscribed somewhat more, three hundred and one thousand and some odd dollars The wholesalers are yet to do their duty and it is my problem to have them fulfil their obligations Up to this time they have subscribed fifteen thousand dollars

'It is a matter of pride that the little state of Maryland is the second largest subscriber to this fund Naturally New York State is the largest California did very well $13,000, Missouri, $37,000, Ohio, $30,000, Pennsylvania, $33 000 I think it would please some of you to know that the late Dr Utech, by his extraordinary energy and interest, was largely responsible for the substantial amount obtained from Pennsylvania

The building was completed and formally accepted on September 14, 1933 Many of these items that I might bring to your attention are so obvious since you have seen the building and visited it that I won't take time to mention them

'I mentioned in my address of yesterday the transfer of property by the United States Government to us, and the exchange of some which we had to the United States Government Fair exchange is no robbery For your information Constitution Avenue has been widened to eighty feet, or will be widened eventually to eighty feet—it makes our site very much more impressive Twenty-Second and Twenty-Third Streets have been widened up to the building line and

will eventually be widened to a greater degree, and Twenty Second Street will undoubtedly become one of the principal boulevards leading over the new Memorial Bridge, past the Lincoln Memorial through Washington north and south

'I come to the real point of this meeting The real point in this meeting in my mind is to tell the members of the ASSOCIATION and ask for their interest, help and sympathy—that I persuaded the Council to permit me to be Chairman of a new committee to obtain a million dollars as a maintenance fund

I expect to start that effort within the next week or two I shall ask the help of the State chairmen to get whatever they can from the individual pharmacists, but more particularly for them to see those men of greater means in their localities whom I shall write to or get in communication with, one way or the other, either see those men personally, or have some one see them and tell them what this building really means to pharmacy, and to them and to the public

I feel that if men with means could realize the true value of the American Institute of Pharmacy to them, that the men in the pharmaceutical work would realize the work of this institute to them not only professionally, but from a selfish viewpoint there would be no difficulty in obtaining the million dollars which I have in mind Of course, we will take less than a million dollars, but we really should have that amount to provide the necessary funds to carry on the necessary work only the necessary work, that should be done in this institution A million dollars is not much money when you look at it from the viewpoint of interest produced from safe investments, one could not expect to obtain more than thirty-five or forty thousand dollars and half of that from five hundred thousand dollars

The ASSOCIATION should have, to continue its work here with some little expansions, certainly from fifteen to twenty thousand dollars a year That is not a great deal to provide when one realizes the great value of the services that can be given by this institution I do want to impress upon you that this building is more or less self supporting at the present time, but barely can get along

'I have already spoken about the kind of work that is going to be done, that is from my viewpoint, in this institution, it is going to bring about the correlation of the professional work in pharmacy, which will result in saving it from some of the influences that are responsible for the present unsatisfactory conditions in pharmacy I hope to see there a representation of all the professional and ethical bodies I mentioned them by name yesterday, the colleges, law enforcement officers, the U S P workers What use they make of it will be a matter for their respective organizations to define but they should make some use of it

Referring to the material value of the institution when you think that millions of people will pass over the new Memorial Bridge, through this new boulevard right past our fine building, and will become interested in what it represents and many of whom will visit it and find out that it represents pharmacy and then they learn what pharmacy really means as a professional and scientific undertaking, it will create a reaction in the public mind which will reflect beneficially in a material way upon all phases of pharmacy, particularly those who manufacture pharmaceutical products The pharmacists cannot hope to maintain the special privileges and keep the prestige that the professional aspects of the calling give them unless it is justified in some way Some of our pharmaceutical houses spend half a million dollars in propaganda work a year I feel that it would be very low propaganda cost to spend five or ten thousand dollars a year for five or ten years to develop this institution which is so obviously of great material advantage to them

'I want to impress upon you that this building has been built at a phenomenally low cost The reasons for that are several One of them is that it was constructed in the time of depression, and the other one is that all of those who were interested in the project made good bargains not only in purchasing the land but in purchasing the building material I don t think it would be an incorrect statement to say that that building and the land we own which cost us five hundred and some odd thousand dollars couldn t be reproduced right now for less than a million and a half It is worth several million and in a few years it will be worth many millions I hope you don't think my statement is an exaggeration It is the only site left in Washington that would be available for a structure of this kind I am telling you that, not with the idea that we should take any advantage of the opportunity and to make money off the project but it does give one a thrill to feel that a value is represented greater than the cost in something which we own

'Regarding the operation of the building—perhaps some of you might think that this building is too big for the headquarters, or too costly to operate The economy of operation of the building is so low that I doubt if an ordinary 3 story dwelling could be operated on less cost Practically everything is automatic Those automatic materials were bought at low cost, the furnace is automatic, oil burning furnace, watering the lawn is automatic, it didn't cost a great deal to install it but it would have cost a tremendous amount of money to have kept the lawn watered We were obliged to have the lawn, otherwise we wouldn't have the site because we could not have received any cooperation through the Fine Arts Commission and the Parks and Planning Commission if we had not yielded to their desires that the location of the building and its surroundings should be developed in accordance with their wishes There are no elevators no loafers and anything of the kind to eat up the funds which are available

"I wish to impress upon the members of the AMERICAN PHARMACEUTICAL ASSOCIATION that this doesn't happen to be Dr Kelly's building or Hilton's or Swain's or mine, nor does it belong to all four of us I could give many other names, don't get your feelings hurt now because I didn t mention your name We turn it over to all of you We feel that you should take more interest in it than you have I mean more effective interest We all appreciate, and we thank all who have worked and have been active in this work It has not been the four of us it has possibly been a hundred of us all together, and a limited number have borne the principal burden perhaps, and we enjoy and appreciate your congratulations

"I wonder if you don't sometimes forget that after all, you should be congratulating yourselves because it is your property I mean by that, that in the future I hope that many hundreds of you will keep the Institute in mind I hope you are sold on it I hope you *don't* think that it is an impractical kind of a thing that as I said in my address the other day, it is a white elephant on the hands of the AMERICAN PHARMACEUTICAL ASSOCIATION It isn't at all It is its savior in a sense I don t mean that it wouldn t live without the Institute but it comes at a very fortunate time, and it is going to help the AMERICAN PHARMACEUTICAL ASSOCIATION do the work that it needs to do to save pharmacy

' We hope that more of you will begin to think in terms of personal position, and begin to do those things which are needed to be done to consolidate and secure the effort which we have made I don't only mean in obtaining money, but in selling yourselves on the value of the Insti tute and selling other people on its value If you will do that we will get the necessary money, and we must have it

'In line with that thought, I am asking a certain number of gentlemen, and I would be glad to hear from any of you who would wish to speak from the floor to speak your minds, and give us your thought in regard to the building as you see it now You probably have already visited it I am sure that the men that I will call on have seen it I hope you will tell us, or tell the Asso CIATION what you think of the building and its value and its prospects I hope you will tell us what you are going to do to make it fulfil its mission and its opportunity '

Chairman Dunning called on **Secretary E F Kelly**, who spoke in part as follows

' I attempted yesterday to express in a few words at the dedication exercises, my concept of this building and what it could do for this profession in which we are interested I believe the time has come, from my experience when consolidation and mutual interest between groups having the same purpose are absolutely essential I think we have to build some place and there create a force and influence which represents the combined influence of our whole body in any purpose which we have in mind I am one of those who believe fully that, if we wish a position as a public health group and as a public health influence, we have to render the service which goes with that title In other words we pay a price for any position that we occupy

"Furthermore I believe that we have reached a place where cooperation between all public health groups is more essential than it has ever been heretofore I believe that the better practice of medicine is as much to our interest as I believe the better practice of pharmacy is of equal interest to the medical men I believe in turn that all such cooperation is in the interest not only of our profession but in the interest of the industries which support them

' As far as I know there is no profession that hasn't some industrial background You can judge from the Chairman's remarks that it is somewhat necessary at certain times to have money, usually furnished by some industrial effort, but it is a fact that all of these professional industries have to cooperate on mutual bases and to help the whole cause Most important of all

cooperation and mutual interest between all groups concerned with public health will be to the public benefit and well-being which, after all is the prime consideration

' I appreciate very much the references that the Chairman has made to the work that the ASSOCIATION can do in that building Now, it is a fact that we can carry on the routine operations of this ASSOCIATION in the building because fortunately we are tax exempt, which means a great deal It rests with the pharmacists of this country to say how much farther these efforts shall go, and certainly they will have to go further than we have been able to carry them heretofore, if we wish to bring about the program which I have just referred to and which I know every one in this room is just as conscious of as I am

"Several years ago it was my privilege to have something to do with increasing the physical facilities of a certain school of pharmacy, and previous to that I was so fortunate or unfortunate as to build a home, and after each step I said, I will never do it again When I built one home, I decided thereafter to rent, and after I had gotten through with the school I thought I was fed up with building and all efforts of this kind We have just struggled through another great building effort and you have heard our Chairman ask for a chance to go on and do something else I, apparently or the group apparently, never know when to quit, but there is an impellent urge to complete a thing of this kind and put it on the very finest basis possible We can operate that building so inexpensively that no type of advertising in my opinion, no type of propaganda, and I use those words in the proper sense, could do for us what that institution can do, may I give a very brief illustration

'It was my privilege to appear before a very important Government commission about a year ago when several men interested in this project were there Incidental to that discussion I referred to the United States Pharmacopœia and one of the most prominent men present asked me, 'What is the Pharmacopœia?' That didn't shock me particularly, because I had had that question asked many, many times After I had explained the Pharmacopœia and the National Formulary, this man said, 'I want to ask you another question, what does the Government give you for the work?'

'I said Nothing '

' He said 'No, you don't understand me I don't mean for the building and all that, but for such operations as this '

"I said, 'Not a cent '

' He replied 'And yet you say these standards are used in the enforcement of Government laws and regulations?'

" 'Yes '

"Then he said 'That is one of the finest public services I have ever heard of, and I think you people are just foolish not to tell the American people about it and let them know that you do that kind of work '

"We hope in this building to illustrate pharmacy and I believe it is going to do that I have been encouraged to watch people come up close enough to read the inscription on the building, and they say it ought to be more easily read I don't think so, because the closer they get to it the better it is

"I am happy to have given the work I have given to that building Nobody owes me any sympathy at all, because of any work I happen to have put into the cause It is one of the most fundamental things that we could possibly do and I say that, because from every angle it is going to help this industry and this profession

It has been my privilege to serve in almost every division of pharmacy I think I have worked actually in all divisions of pharmacy, possibly with the exception of a wholesale house I am looking forward to that experience before I die I say this just as much from the standpoint of the manufacturer and wholesaler as of the practising pharmacist—that if we don't elevate this profession and this industry with which we have our names and reputations connected nobody is going to do it for us Don't sit around and wait for the United States Government or anybody to promote our cause if we are not worrying about it.

' I will never forget the story of the mother bird who came home and the little birds said We have to move ' and the mother said Why?' 'Well the farmer is going to call in all of his friends to cut the wheat.' The old lady said Well don t worry about that ' A few days later she came home and they said We have to move ' She wanted to know why, 'Well the farmer

came down and expressed a great deal of dissatisfaction with his friends and he is going to have the neighbors help him ' But the mother bird said, 'Well, we won't worry about that' A few days later the little birds said, Mother, the farmer came and said the rest of the country could go to thunder, they are going to cut the wheat themselves ' The old lady said, 'Now it is time to move '

My opinion is that, if we want to improve our calling, we have got to do it for ourselves and I am going to put everything I can into that objective "

Chairman Dunning thanked Secretary Kelly and called on Prof Charles H LaWall for a few words, he said in part

The Headquarters Building, in my opinion, is symbolic of what pharmacy can do, and will do It is a torch to light the way to future things It is a symbol of idealism which I believe can be realized if we put it up to the pharmacists, who must start from new foundations, you might say, on the road toward success We must cast aside some of our misbeliefs, we must start toward new goals, but with the inspiration of the building which we now have we cannot fail in our ultimate purpose

I believe that we can build up a membership of more stable and interested individuals than we have ever had before I believe that we can center certain activities there which have never before been recognized to be in existence, and I look upon it as the home of American Pharmacy for the future "

Chairman Dunning called on R E Lee Williamson who responded in part as follows

' It might be presumption for me to say very much more than has been said about this building both yesterday and to day But there is in me a respect for the emblem of ambition in that building A conception of the idea was made known to me in the very beginning and the thought of the proposed effort made such a tremendous impression upon my imagination and so fired my respect and love for pharmacy that from that day until yesterday it has never been out of my mind

'I played a very small part in the gathering together of that which was necessary to make the building I watched it grow, I watched the plans they were drawing I observed the insistent effort of Dunning and that of Kelly and their persistency as they pushed on toward this ultimate goal I saw the day the ground was broken, the first shovel full of dirt that was dug I came out here whenever I was in Washington, to take a look at what was going on Some nights I came out and sneaked into the building and was held up by the watchman, and then got the watchman to turn on the lights that there I might revel in this dream that was coming true As it went along I gloried in it and all the time there was pictured in my mind that pharmacy had grasped an opportunity, and that it was building something that was going to do in my humble opinion, more for the profession of pharmacy than has yet ever been done for it I am still of that opinion I think this building is an emblem, an emblem of Pharmacy It will be in the eyes of the public, the eyes of the people of this Great Nation and of the world This building, in my mind is like the cross to the Church, or the flag to the nations, and it is now our obligation to keep this emblem of Pharmacy unsoiled

' Just as we kept the cross from being desecrated and just as we kept the flag from being insulted, we will do that with this building and in the pride of our hearts and the love of the profession, I know that this group of men will not fail to carry on high this building the emblem of pharmacy, down on through the ages It can mean to pharmacy and it does mean to pharmacy the greatest step forward that it has every attained It means that if properly directed and properly held on high, that the public will become more and more conscious of the vital importance of pharmacy in the public health scheme Carry on we must and with this group of men here it will go down through the ages in the history of pharmacy as a wonderful accomplishment I agree with Chairman Dunning that at no time in the future will the men of pharmacy let go this opportunity, but will force it on and support it as fully as it has been supported up to this time

"I have, absolutely, an abiding confidence in that effort and if there is anything again that I can do in my humble means, please don't hesitate to call on me, because I will do it "

Chairman Dunning replied that he would remember He called on Henry D Faxon of Kansas City, who spoke in part as follows

"Every one who attended the dedication yesterday was very much impressed with the sincerity, the dignity of the speeches, of your presiding officers I never heard anything better

than the address of President Swain, my grandson said, 'I love Doctor Kelly,' he knows what he is talking about, I have heard talks of symbolism, and the thing that struck me was that you were exceedingly worldly wise in your symbolism, that you have done a thing which captures the imagination of people, that places you in a very practical sense as leaders in the pharmaceutical world

' Mrs Newcomb was kind enough this morning to take my grandson on a sight seeing trip, and she to day was telling me they passed the Institute of Pharmacy, and the kid, said There is the Institute of Pharmacy' and some lady on the front seat turned around and said, Well, think of that the nerve of those people '

Now that is what you need to place yourself in the public eye I have been a member of the ASSOCIATION for many years, I never have seen you, never have met you and I am somewhat like a man who has not been to college, who always paints too lovely a picture of the college university training I have always compared my scientific men with those that have largely asso ciated with you Unfortunately, my life has been laid strictly in the commercial field and when I received your letter Dr Dunning, I tried to think of what I might say that would be of some service to you and still not be along the regular lines of paying homage to your beautiful building You gentlemen have all faced the trite question how far persistence can go, and still live and it is an old question It seemed to me that it is fair to say that life depends on two phases one through intensity on one object and one through the aggregation of other material It seems to me that to keep from being static you must add to your activities, and there is no use of con ducting pure pharmacy if it doesn t finally lead to the goal of making a human life better

Dr Stanbury yesterday spoke about the changes in pharmacy and Mr Weicker spoke of it also To my mind, pharmacy must concern itself with distribution otherwise it will fail in serving the public, while at the present time pharmacy is represented by drug stores wherein there is conglomeration of all kinds of merchandising, still somewhere there should be a place to set off the ideals of pharmacy You gentlemen have sought perfection, that is very evident in looking at this building and in watching your dedicatory exercises There must be improvement in distribution and in all divisions if pharmacy is to continue It seems to me that if you are going to be all embracing, you must face the situation on down through to the consumer It seems to me that somewhere your plans must include the study of distributing the products which are made by the manufacturers or compounded by you, on to the ultimate consumer

' I did not hear Dr Dunning's first remarks, but I want to say, I have high regard for this organization and that anything I can do, I am willing to do I am a wholesale druggist and don't know how well the wholesaler fits into the picture I asked Dr Newcomb how many members you had among us and he gave a very limited number It occurs to me that you must get us in, that we should work in harmony with you and you with us, that there must be cooperation of the trade and the profession, and so far as mine amounts to I pledge you my efforts Thank you

Chairman Dunning thanked Mr Favon and stated that many of the ideas presented by him have been discussed and this building represents the aspiration which you have in mind in correlating the professional and scientific endeavor of all phases of pharmacy and of those who are interested in the profession and advance of pharmacy

He was very much impressed by the remarks of the grandson and not at all critical of the statement made by the lady in the bus He well understands why she would make such a remark, it is all because we have lacked nerve and here is a little demonstration If explained, the lady would be surprised if we tried to teach her what pharmacy represents to her and to the world at large Pharmacy must get rid of the inferiority complex There is no activity that is more essential to the world's welfare than our own so long as drugs are used for the treatment of ills If we stop using drugs we are of no consequence but we represent the science and knowledge of drugs I am not talking about we retailers, alone I am talking about pharmacy in general After all we are all one body whether we are in the manufacturing field wholesale field, all must have the same knowledge to deal with drugs

Chairman Dunning called on Dr Ernest L ttle who responded

He was impressed by the story that Dr Kelly told and it recalled to him a story that he heard just a few days ago about a bird which bird had developed the ability to fly backwards and even among birds that is a rather unusual procedure When being asked by one of its asso

ciates as to why it saw fit to fly in such an unusual manner it replied that it wished not only to know where it was going, but that occasionally it was interested in knowing where it had been The speaker continued

"It seems to me that we, like this very wise bird, could well spend a few minutes at this time looking backward If we do so, we shall see a number of exceedingly active, capable conscientious men concerning themselves about raising funds for a pharmaceutical headquarters building in Washington One of the most active of this group, and it would be impossible to name all of them, was Dr Dunning of Baltimore, ably assisted in the earlier years by Dr Newcomb These men worked conscientiously over a long period of time until to day we have the fruits of their labors for pharmacy and pharmacists to enjoy in all the years to come The building is indeed a work of art and is a credit to the pharmaceutical profession

"To day we meet to rejoice in its successful completion and to concern ourselves as to how it can best be used for the profession of pharmacy in the years to come We all realize, I am sure that the contribution which it is to make to the profession of pharmacy depends not so much on its beautiful exterior, as it does on the activities which are to be carried on within the building It is a satisfaction to learn that Dr Dunning and his associates do not feel that their labors are ended with the completion of the building but that they are now starting a million dollar endowment campaign for the support of this magnificient structure I am sure that sincere thanks of the pharmacists of the country go out to these men for work which they have begun and for their continued interest I have been called upon unexpectedly as a representive of the American Association of Colleges of Pharmacy to comment as to the constructive uses which could be made of this building Although I am president of that association I do not feel that I have the authority to attempt to give you the views of the Association I can assure you, however, that the pharmacy colleges of the country are anxious to make as extensive and constructive use of this building as possible and are anxious also, to cooperate with the pharmaceutical organizations in enabling it to make its maximum contribution to the profession in which we are all engaged

"I can look ahead to the not distant future when all the pharmaceutical organizations of the country will or should be housed in this building Constructive planning of a comprehensive nature would be much more possible under such conditions than it is to day It would be well if the American Association of Colleges of Pharmacy could afford to make use of a permanent secretary whose office could be in this building Probably the Association will not be able to do this at the present time or possibly for some time to come The American Association of Colleges of Pharmacy rejoices with you in this advancement for pharmacy I assure you of the continuation of the Association's interest and support We shall deem it a privilege to go along with you every possible way "

Chairman Dunning called on President C T Gilbert, of the National Association of Boards of Pharmacy He spoke in part as follows

"I am pleased that so many of the speakers have spoken their thoughts on this building, all of which I endorse, so that I won't have to repeat them, but speaking for the National Association of Boards of Pharmacy, I believe that no association in this group more fully realizes the benefits that will accrue to that Association by having its permanent office in the Institute of Pharmacy, being the association of licensing and enforcing officials, the benefit of being close at hand and in touch with the governmental affairs, having the advantage of the statistical reports that will be available in this building it will be of great value to our association

"We have gone a little further than the American Association of Colleges, and it may please you to know that the executive committee of our association has already taken steps to soon occupy that building with our main office there On Sunday evening in this hotel, the Executive Committee passed a resolution that our office would permanently so be established in this building by May 1, 1935, if possible, and not later than January 1, 1936

"I assure you, Dr Dunning, that the National Associations of Boards of Pharmacy are in full accord with everything that has been done in the erection of this building and that we are with you in spirit and also in action "

Chairman Dunning called on Dr R A Lyman, he was of the opinion that Dr Little was to speak for our Association and all he could say would repeat what he had said and this expresses the sentiment of the American Association of Colleges of Pharmacy He added

"We are very happy at the completion of the building The teachers and students in this

country had a large part in the collecting of funds and the making of the building possible It is true that in any line of work, the educational institutions are the institutions which have ideals, which should have the visions and should teach the coming pharmacists of the country what those ideals are, and do everything that we can in a teaching way to put them into effect and maintain a high standard of pharmacy

'We are very very happy, the men who are engaged in educational work, because we at last have reached a point where the colleges of pharmacy have taken their place among the academically rated institutions of the country Two or three years ago we went to a minimum course and when we did that we joined the great family of colleges

"We want to do our part, working with the other phases of American pharmacy in this national work We want to do our part in maintaining the dignity of our profession, and we are happy that we have this beautiful building representing the highest ideals of pharmacy

"I like especially the things that Mr Faxon said, and I am sure, Mr Faxon, that we educators will bear in mind the things that you have said and we will do all that we can to see that every phase of pharmacy is represented in our teaching institutions, so that the high ideals which you have in mind may be incorporated along with our scientific ideals "

Chairman Dunning introduced Secretary Ward of the American Association for Advancement of Science He said in part "I think that I may say with perfect correctness, that the American Association for the Advancement of Science represents not only the largest and the only nation-wide organization dealing with all sciences, both pure and applied, but it is also the oldest with a continuous history in this country of ours

'We celebrate this year not by any form other than that which accompanies our regular meeting, the hundredth formal meeting of the organization That does not mean quite a hundred years of history, because we frequently have met more than once in a year, and during the Civil War for example the meetings of the Society were not held That organization is sufficiently old to have seen all of the structures that in a beautiful array run along the Avenue here for a distance of nearly a half mile It still remains in three tower rooms in the old building which was erected in honor of James Smithson of England, who gave his fortune to the United States for the advancement of science without restrictions and without qualifications

"And for one, speaking really for the whole organization of 18 000 members, I have seen enough in the last three days, that I have enjoyed with you through the courtesy of your President and Secretary, I have seen enough to be proud of the fact that the AMERICAN PHARMACEUTICAL ASSOCIATION is one of the affiliated organizations connected with the American Association for the Advancement of Science The thing that impressed me most definitely was, really not the beauty of that building which you put up, nor the general dignity and impressiveness of the accommodations there for the work you represent nor yet the character of the persons who in considerable number I have had the privilege of meeting here, although all of those things made an impression on me, but the thing that impressed me as one of those who has spent forty years and a little over in teaching in the universities of our country was the thing that lay behind and underneath that building

'I wonder if you thought of the fact as you might very easily have done if you had known the history of these buildings along here that your building is unique It was not built by virtue of a grant from some foundation, which you sought and obtained as you might have done so very worthily for this purpose It was not built out of the donations of some single friend There it stands as a record of thousands of your members who pledged themselves in large and small sums for the building of a home for the profession that you represent

It has a substantial foundation in the personality of the profession and not in the beneficence of some foundation or will to do honor, and to one who has been a teacher, that is after all the most substantial foundation upon which anything can be built

'I have no doubt for a moment but that you will go ahead with the larger plans which Dr Dunning has suggested and develop them successfully Men who contribute in such sums and such numbers to the purpose of the profession with which they are connected are looking forward and will not turn back, and the American Association for the Advancement of Science wishes you that full and abundant success that your devotion merits and will secure "

Chairman Dunning thanked Dr Ward and referred to having introduced him as our

neighbor across the street He was informed that this was not the case, but he was convinced that all recognized in him a neighbor

Chairman Dunning asked F H Freericks to comment

Mr Freericks referred to the time of selection of the site when Cincinnati, the valley from which he hails took a very interesting, a very interested and a very determined position The good people of Cincinnati subscribed one hundred and fifty thousand dollars on condition that the building dedicated yesterday would be located in Cincinnati Few, if any other cities, were so determined, and expressing that thought, he knew the Chairman, and all of you would realize how deeply at least he and others felt that such a building would include wonderful possibilities for the AMERICAN PHARMACEUTICAL ASSOCIATION Mr Freericks continued 'It was my privilege and pleasure to attend my first AMERICAN PHARMACEUTICAL ASSOCIATION meeting in Baltimore in 1898, and I have missed but few of the conventions I have felt for many many years that there would be nothing so helpful to American pharmacy, nothing that would bring pharmacy better to the attention of the people generally, and to the thousands of those who have neglected being members that would justify such a building as we now have here in Washington

May I being wholly unprepared, say on this occasion, that yesterday sitting there in front of the wonder building which is a monument always will be to American Pharmacy I never listened to a more inspiring address a more appropriate address, to a more statesman like address, than the one presented by President Swain It was so fitting, it went so to the heart it was so convincing '

Referring to a friendly remark made when introduced he said

Now I see as I am sure you all see, and may I before I say that say that I have no grudge at all toward or against Dr Dunning I want to accept this opportunity to thank him in your presence for the wonderful work that he has done, for the work that he can be proud of to the end of his day as one of the outstanding things in his career, and one of the outstanding things in American pharmacy ' He continued

In endeavoring to find a thought that is practical in its application after all that is what you are seeking I believe on this occasion, something that might be helpful in the way of a suggestion or a thought thrown out, I see in the building dedicated yesterday by this ASSOCIATION, a milestone the turning of a new leaf

I see with certainty that these thousands of men in American pharmacy who have neglected the professional side of their calling will turn to it I see in it the likelihood, yes the certainty, that there will come to this ASSOCIATION the petition, such as was indicated by our President in his address last evening the petition of pharmacists that they might have the privilege of being members instead of being solicited for membership

I see in it the issuance of statements, emanating from that center of pharmaceutical activity that will bring to the attention of the people advancement in pharmacy resulting in turn to a feeling in the American public and in the mind of the American public that a man who professes to be a pharmacist, and is not a member of the AMERICAN PHARMACEUTICAL ASSOCIATION is a person of minor importance, and not of much worth in connection with his calling I visualize that this condition is going to be brought about by the wonderful building and all that it represents

Mr Chairman I want to thank you for this opportunity and privilege of having said a few words I had no reason to expect that I might be called upon, and for that reason I want to say in particular, and express how deeply I appreciate the opportunity of having had the privilege of saying a few words at this time I thank you for what you have done for American pharmacy "

The Chairman said he hoped that Mr Freericks would feel somewhat compensated for the loss that was incurred through him He also desired to bring to his attention that the pharmacists again showed their nerve *first* they put up a building here, and *second* they turned down one hundred and fifty thousand dollars He had a long list of interested pharmacists to whom he would like to extend an invitation to speak but time was limited because of other business so the number would have to be restricted He would like to hear from State chairmen

Dr R B J Stanbury said he had listened with a great deal of interest and it had certainly given him great inspiration He said a great thing had been accomplished in the building and he felt that it would be the beginning of a new era for pharmacy in this country He and his colleague Mr Jacobs, appreciate very much being present at this convention The annual convention of

the Canadian Pharmaceutical Association will be held in the city of St Johns, New Brunswick, August 6th to 9th, and he extended to this ASSOCIATION an invitation to send representatives to that meeting, and for all a very cordial invitation to be present They would be delighted to meet and greet the visitors

Secretary Jacobs, of the Retail Druggist's Association of Toronto, Canada, said he had enjoyed very thoroughly this convention, and appreciated this opportunity to say what a pleasure it had been for him to be here The convention held in Toronto a couple of years ago was a great inspiration to Canadian pharmacists and stimulated the professional side of the business considerably He wished continued success with the building project, and also all its hopes (Both Dr Stanbury and Secretary Jacobs have been members of the AMERICAN PHARMACEUTICAL ASSOCIATION for a number of years)

Chairman Dunning said he was now going to introduce a gentleman, who had been particularly active in the work that had resulted in the establishment of the American Institute of Pharmacy He had not been heard from so much during the last few years, but in the beginning of this undertaking he was most active, as many remember in developing the necessary publicity and directing the educational procedures that stimulated the interest in the project and made those who afterward supported the building minded to give up their worldly goods for a good cause He introduced Dr E L Newcomb, of the National Wholesale Druggists Association, who spoke in part as follows

I am very happy to have an opportunity to say a few words to you at this time, on the subject of the afternoon It is true that I have not spoken during the last three or four years on this project That is not because the subject had become of less interest to me but because it seemed to me that we were making very rapid progress and that the time would soon come when it would again be necessary for us to again inject into those far sighted plans of Dr Dunning, the determination to carry on Dr Dunning has outlined to you during the dedication exercises in a general way, his vision and plans for this building, for the services which it may render to American pharmacy I like Dr Little believe that it is an opportune time for us to look back before we again look ahead just for a few years, and measure our progress

This vision of a pharmacy building, of course, is something which is many years old, possibly older than I am I have been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION for just about thirty years and it was one of the subjects which I heard discussed during the first years of my membership, but it was not until a few years ago down in North Carolina, up on top of Mount Mitchel that H A B Dunning unfolded his vision, and it was there over a mile above sea level, that this magnificent building was first seen and Dunning is the man that saw it at that time I did endeavor to help him and I am going to continue my endeavor to help him As we chatted over the subject up there on top of Mount Mitchel, we saw something which we tried to place before all of American Pharmacy during the succeeding years, when we were endeavoring to raise a fund of a million dollars, and I wonder to day if you have that picture, because I think it is essential in order to have that building bring the results that we have a right to expect

The results have partly been attained As we looked over the landscape from the top of Mount Mitchel we saw American pharmacy as it exists in this country Down in one of those beautiful valleys we saw the AMERICAN PHARMACEUTICAL ASSOCIATION, representing four or five thousand members from all branches of American pharmacy Down in the other direction, we saw another army of American pharmacists the N A R D , with fifteen or twenty thousand members, the retail pharmacists of this country, and in another direction we saw the National Association of Boards of Pharmacy, and in another valley the American Association of Colleges of Pharmacy and in another direction the National Wholesale Druggists' Association, and again the Federal Wholesale Druggists' Association and we looked further, and we saw another great army of pharmacists, the American Drug Manufacturers' Association and in another direction the American Pharmaceutical Manufacturers Association and again the United Medicine Manufacturers Association and in another direction the Proprietary Association

They are all great organizations rendering valuable service to their respective groups, but as we looked further, what did we see? We saw that none of these groups was accomplishing what they hoped to accomplish for their respective organizations and we asked ourselves the question as to why these accomplishments were not being secured Our analysis was that funda

mentally all of these groups were at heart dependent on the success of pharmacy, and pharmacy as a profession, and that there was need for the protection for the development, in order that American pharmacy might render its full and most valuable service to the American people, that there be some coordinating influence, some correlation between these different organizations, and that was the fundamental thought back of establishing an Institute of Pharmacy, which might represent all, and which might stand for the highest ideals of American Pharmacy

' The first step has been taken The Institute materially has been created the personnel is back of the project, and as Dr Ward said, with a backing of sixteen thousand individuals, you have a movement started You have something which hardly any other professional organization in American Pharmacy can boast of

' Now, what are we going to do with our material equipment? That is the next proposition, as I see it I did not hear what Dr Dunning said at the opening of this session We have discussed it, and I think our views coincide, and briefly, they are this

"The Institute of American Pharmacy to-day needs at least a million dollar endowment fund, possibly more, and I want to say to you that a million dollar endowment fund for the American Institute of Pharmacy is yours for the asking

"Many people say to day, 'Well, these are hard times, it is impossible to raise funds' That is not well founded Take any issue of 'Science' and look through it, and see the billions that are left and donated and contributed even during these hard times for real worth while scientific professional work I do not begrudge the medical profession a single cent that they obtain but they have obtained millions that were paid by pharmacists and the only reason why pharmacy has not secured many of the gifts to which it is rightly entitled is because we have not had more nerve It is up to the AMERICAN PHARMACEUTICAL ASSOCIATION, I believe, to take the lead and to back up the present committee or any new committee which may be created to establish an endowment of at least a million dollars, to maintain this institution in order that it may render efficient service

"Now, what are some of those services which this institution may render? In the last *Headquarters Building Bulletin* appears a review of eight pages, wherein you will find enumerated some of the services and features which an institution of this kind should and can render—not alone for the protection of American pharmacy, but for the protection of the American public, because that fundamentally is the only cause for pharmacy to exist or for this institution to be maintained As Dr Dunning said, if the people stop taking drugs and medicines, there is no reason for us to exist

Now, a word or two about the various branches of American Pharmacy, and their relation to this institution The AMERICAN PHARMACEUTICAL ASSOCIATION is fundamentally the one organization in this country with which all branches of American pharmacy may directly or in directly be affiliated It is the one association in which those who are members of manufacturing concerns, wholesale concerns, retail distributors boards of pharmacy and colleges, or other divisions may become members We have to day a great need for the AMERICAN PHARMACEUTICAL ASSOCIATION, a greater need than ever before in the history of American pharmacy Right to day over here in the Department of Commerce administrators and deputy administrators shake their heads with doubtfulness when the subject of professional pharmacy is referred to They do not fully appreciate that pharmacy is rendering a professional service, and pharmacy is a profession Please do not confuse ethics with professionalism The commercial activities of our present day pharmacists are not non-ethical, they may be perfectly ethical Many of them are commercial, and some have become so extreme that they have over shadowed our professional services and tended to mislead the American public in their appreciation of the value of the professional services which pharmacy renders

' In my judgment the American Institute of Pharmacy, with an endowment of a million dollars or more may very adequately maintain a service bureau to present to the American people truthful, up to date information on the professional aspects of pharmacy That Institute functioning as it should with research laboratories, may at frequent intervals issue reports from these research laboratories on new products which are used in medicine It may reflect honestly the views of ninety per cent or more of American pharmacy which is truly and sincerely interested in scientific professional service

When President Roosevelt said that ninety per cent of the industry of this country

wants to do the right thing, he might also have said that ninety per cent of our professional organizations are high minded and are determined that the highest ideals of the professional practice shall prevail We have in our professional practices, dentistry pharmacy and others, a minority who will be willing to lower the value of that which the majority stands for, and it is that minority in pharmacy which has tended to belittle the work of the ninety per cent, because we have not had an institution which will give to the public an understanding of the service of pharmacy

Only last week a member of the Board of Regents of one of our great states said to me that he felt it might be a mistake for his state to adopt a four year course in pharmacy, I replied I am certainly surprised to hear you speak that way You are a graduate of Harvard University, you have sent your son to Harvard, but you don't think that a pharmacist needs to have a simple undergraduate course as a requirement ' Finally he said, 'Maybe you are right '

'We are developing gradually, we are coming to a point of view which is more in line with the ideals which we hold, and unless we do aim for those ideals we are not going to make the progress that we should make

' It doesn't make any difference whether an institution is engaged in manufacturing a proprietary medicine or prescription specialty, or U S P , or N F preparation, or in wholesale activities, the welfare of that institution is determined and dependent upon the future welfare of American pharmacy, every institution that handles or manufacturers or deals in drugs or medicines in any manner, shape or form will be benefited in proportion to the success of this Institute of Pharmacy

I am of the opinion, that when this new campaign is started for an endowment, you will see a better response from wholesalers, because I believe that the last nine months have demonstrated to American pharmacy as nothing else has ever done, that we have got to stick together and unless we do support professional pharmacy as the heart of the entire drug industry, and back it up in every way, every one of our interests are jeopardized If I can render any service in raising another million dollars I will do it, and again talk to every college of pharmacy in the United States, and to every state association and local association, if necessary This project, in my judgment, is worth a lot to the wholesale druggists, to every retailer and to every other branch of American pharmacy, and we must keep it on a high plain

"I am glad that the American Institute of Pharmacy has become a reality, in this city and on this site Chicago wanted it, Cleveland and Cincinnati wanted it, but they now realize that here is the place for it I am glad the building is in Washington, that is where it should be

"It is up to every branch of American pharmacy to back it up, I hope what has been said here to day, whether you be retailer, wholesaler or manufacturer, it will cause you to leave this meeting, determined that when you are called upon to do your part you will do it

I am glad that there is a stenographer here, because the record of this meeting, and what has been said by Dr Ward should be broadcast as one of the finest pieces of publicity, throughout the entire length and breadth of this land Thank you "

Chairman Dunning said he would call on just one more gentleman, for a brief talk and for a special reason

'I came over here to Washington eleven years ago to meet the Executive Committee of the AMERICAN PHARMACEUTICAL ASSOCIATION to explain some of the remarks that I had made in a public statement in the *American Druggist* I won't go into detail in regard to it After talking an hour or more before the Executive Committee, and not making what I thought was satisfactory progress, in convincing the members of the possibility of carrying this project through I woke up and in a rather disturbed state of mind I then, again, made a few dynamic remarks which I regretted Mr Walton arose and cleared the atmosphere at that time and possibly the story might have been changed if he had not done so "

Mr Walton said the Chairman surprised him as he had no idea of being invited to speak, he did not want to take direction from the Chairman as to what he should say but would tell the story if there was no objection

"I rejoice with you, in being present at the dedication of this wonderful building It has been a matter that has deeply rooted in my heart I hoped that in a small way I might do something to bring this about

"Fortunately, I happened to be in a situation one day ten or twelve years ago, to which

Dr Dunning referred One of those situations which might well be characterized as the news papers do in pictures, 'When a Fellow Needs A Friend ' That was the occasion of the meeting of the Council in this city, after I had been elected chairman of the House of Delegates and I was invited by Chairman Beal to attend that meeting for another reason I sat through the discussion of the meeting in one of the hotels of this city, when Dr Dunning came in and made known his plans for the development of this building

' Also it was the occasion when the Council was called upon to decide whether or not they would accept that very generous offer from the American Druggists' Fire Insurance Company or whether they would have a building of their own This matter was discussed all morning I was not called upon to say a thing but the consensus of opinion seemed to be at the time of adjournment, that the question had better be put up to the ASSOCIATION for decision

'Immediately after coming to the afternoon session Dr Beal invited me to say a few words He said that I had been listening to what had been said and asked what I thought about it

' I said what was in my mind, and it was this It seems to me that the Council does not have the courage of its conviction From what I have heard this morning all of you seem to think that we ought to have our own building '

The result was that the action of the morning was rescinded, Dr Dunning with his indomitable will and energy started in to give more reasons why we should have this building of our own and as a result to day we have this beautiful building I am very glad that I have lived to see the day when it was erected "

President Swain thanked Chairman Dunning for this highly interesting and certainly a deep and stimulating program He presented to him and all others who participated in this after noon's session his very earnest and very deep and sincere appreciation

Mrs Lyman F Kebler was presented She spoke in part as follows

"This is a great privilege to speak before you Year by year day by day, we make history Some of our history is recorded and some of it is not We happen to have a book with a record of the Women's Section and a gavel of historical value I have come before you to to ask that in the interim of the meetings we may have a place in a case in the museum of the new building, to place this book of records and this gavel

'I want to express appreciation to Dr Dunning for coming before the group of women in Des Moines and giving us the opportunity of contributing collectively our money to this wonderful building We are proud of the building and are planning to carry on and hope to meet in Portland I thank you for this opportunity and assure you that with the opportunity comes responsibility and we are going to do our best to meet that responsibility Thank you '

President Swain introduced Frank L Coniglio, representing the Student Branch of the University of Florida He briefly referred to the work of the Branch and pledged its members to support the ASSOCIATION in its efforts

G G Campbell, of the Student Branch of the University of Pittsburgh reported on its work and expressed his pleasure because of the opportunity of being at this meeting

President Swain introduced E Fullerton Cook, who, he said, would discuss a forward looking constructive project

Before presenting his subject the speaker referred to the inspiration and enthusiasm felt by the pharmacists as this magnificent Headquarters building was being dedicated He thought of what this would have meant to the fathers of American Pharmacy, of the AMERICAN PHARMACEUTICAL ASSOCIATION if they could have been present It had been his privelege to know intimately many of them and he referred particularly to his association with Professor Remington and conversations with him on the future of American pharmacy

"The time has come," he said when with this magnificent background, with this perfect setting, with this strong organization to give us the opportunity to plan and organize the perpetuation, and the permanency of pharmacy "

He had given a great deal of thought to the problem of how to do this how to practically establish professional pharmacy so that the laymen, the physician, the scientists the educational world, shall accept without question the status of this great profession He had taken up the subject with medical groups, both the American Medical Association and the officials of the American Hospital Association of the College of Surgeons, so that the medical side might be thoroughly discussed

As a result he had asked the privilege of preparing a plan, a suggestion, it simply is a suggestion which was discussed before the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION As a result the Council appointed a Committee of men thoroughly imbued with the ideals of pharmacy to further study the question and report back to the Council whether or not this plan or some modified plan can be put into effect not to day but in the immediate future

The author stated that there are two associated statements which had been handed out which are attempts to outline more specifically the services which professional pharmacy is rendering to day, and for which there is a tremendous demand almost beyond the conception of many who are in pharmacy

These papers are deferred, but the services referred to are, in part brought out in the discussion The *bulletins* are entitled The Routine Service Offered by a Well Organized Pro fessional Pharmacy" and Special Services Offered by Some Professional Pharmacies ' *Bulletin 2* is made part of this report, as read

A SUGGESTION FOR THE ESTABLISHMENT OF A NATIONAL COUNCIL ON PHARMACEUTICAL PRACTICE UNDER THE AUSPICES OF THE A PH A

BY E FULLERTON COOK

It has been suggested that there be established, what has been spoken of as a 'National Council on Pharmaceutical Practice," under the auspices of the AMERICAN PHARMACEUTICAL ASSOCIATION and with the headquarters and secretary in the new A PH A building in Washington

The basic membership of this National Council would be from A PH A members, by appointment by the A PH A Council and specifically represent the following organizations

REPRESENTATIONS

The A PH A —possibly five members, including the Chairman of the N F Committee of Revision, the U S P —Committee of Revision, the American Association of Colleges of Pharmacy and the National Association of Boards of Pharmacy

It is also suggested that the following be invited to participate in an advisory capacity as auxiliary members

The N A R D Committee on U S P and N F Propaganda, the American Drug Manufacturers' Association, the American Medical Association (through either its Council on Pharmacy and Chemistry or Council on Medical Education and Hospitals) the American College of Surgeons—(this body establishes many of the standards for hospitals in the United States), the American Hospital Association the Food and Drug Administration (enforcing Drug Standards) the Surgeon General of the Public Health Service the Surgeon General of the Army (Medical Administrative Corps) and the Surgeon General of the Navy (Hospital Corps)

The larger group would be divided into three sub divisions

1 The professional pharmacist in retail practice coöperating with physicians in general practice

2 The hospital pharmacist

3 Such action as might be found practicable in promoting professional pharmaceutical service in the United States public health, military and naval organizations

All appointments to this Council would be made after consultation with and the approval of the group represented The sole purpose of this Council would be the promotion of more efficient pharmaceutical service in each of the fields represented

FIRST OBJECTIVE

The primary objective would be to specifically study the needs of each field of activity and then prepare and announce to the Country the minimum specifications as to personnel the physical equipment which should be provided to insure efficient service The Council would also make a restatement of codes of ethics and practice for each group as the basis for a high pro fessional standard

SECOND OBJECTIVE

After developing and announcing the statement covering professional standards each group would endeavor to promote the adoption of what was believed to be a minimum standard in each field They might proceed somewhat as follows

GROUP 1—RETAIL PHARMACEUTICAL PRACTICE

Suitable machinery would have to be set up with a secretary, so that established professional pharmacies throughout the Country might be given the opportunity to voluntarily 'register" with this ' National Council "

Such "registration" would require the setting forth, on a suitable form, of all essential facts about the professional side of the business, covering such points as

1 The training and experience of the pharmacists in charge and doing professional work

2 The character of the physical equipment, including stocks of drugs, chemicals volatile oils and galenicals with their quality and preservation Also how biologicals are kept, the kind of balances used, the sterilization equipment, etc

3 A catalog or list of the books available in the professional library

4 The character of the professional work done in the pharmacy during the preceding year and its percentage relationship to other departments in the same establishment

5 The relative floor space devoted to the various phases of "professional pharmacy,' as compared with other departments in the same establishment

The word "pharmacy" should be insisted upon and the word 'drug store" not permitted

NOTE The use of the designation pharmacist" or 'apothecary" would be recommended as appropriate terms

When reported facts on the questionnaire seemed to conform to the rigid specifications established, as an evidence of the spirit and ability of the pharmacist responsible for the establishment, an inspection would be arranged and if this is reported as satisfactory, the pharmacy would be registered for a limited period say two years, subject to reregistration upon evidence being submitted which indicated the maintenance of the standards

All established pharmacies in the Country would be invited and urged to "register" Compliance with the minimum standards believed to be necessary for the maintenance of high professional ideals is all that would be required The financial cost to the pharmacist to equipping for such pharmaceutical service would be relatively small This has recently been outlined by Mr Delgado in the JOURNAL OF THE A PH A (July 1933, page 680)

Professional assistance, through the periodic publishing of information on prescription practice, on the latest ' Materia Medica," suggestions for professional helps to physicians etc, would be a feature

In this way it is believed that a group of our existing professional pharmacists would be encouraged and helped to render better service to the medical profession and the public also that these pharmacies would be justified in appealing to physicians for support as a group and that physicians could ethically recommend their patients to have their prescriptions filled in these pharmacies, registered by the "National Council "

There is nothing in this plan to prevent any pharmacist participating in this program It will not require more than every registered pharmacist is now expected to offer Large organizations of department store type could readily meet all requirements by establishing a properly organized professional department George B Evans demonstrated the practicability of this many years ago

GROUP 2—THE HOSPITAL PHARMACIST

In the 1933 Hospital Standardization Report of the "American College of Surgeons" will be found the "Manual of Hospital Standardization" which sets forth the standards which must be maintained by a hospital which is to receive recognition by the medical authorities in this Country These specifications are accepted by the American Medical Association and by the American Hospital Association

Under "Pharmacy" the following statement is made

' Many hospitals have a pharmacy with one or more registered pharmacists employed either

part or full time The managements of several institutions believe their pharmacy afforded a financial saving To increase the economy relative to expense of medicine, the professional staff was requested in many cases to limit the amount of proprietary medicine prescribed in hospital practice and make use of their personal prescriptions for compounding drugs The use of a carefully worked out hospital pharmacopœia tends to increase economy and efficiency "

The truth of this statement has been throughly proven and the object of the sub group, dealing with the pharmacy of the hospital would be to first determine the minimum specifications for a hospital pharmacy covering the personnel the stocks and their handling the library and apparatus and other features such as manufacturing and buying

The ultimate saving to the hospital is another phase of outstanding importance since the adoption of this program must justify itself economically by more than paying a salary sufficient to insure the employment of a well trained pharmacist who would be a member of the official staff of the hospital

The pharmacist should have an educational background which will enable him to meet the medical staff with justified confidence, bringing to the group a knowledge of drugs and their action, combinations and dosage forms

When properly developed the installation of such a properly manned pharmacy should become one of the requirements for the registration of the hospital

GROUP 3—THE U S PUBLIC HEALTH, MILITARY AND NAVAL PHARMACISTS

This Council would endeavor to work, in coöperation with the Governmental organizations in the development and extension of this phase of pharmaceutical service

The author said that Pharmacists R R Gaw of Pittsburgh, H A K Whitney of Ann Arbor, and Mr Sechrist of New York, would discuss phases of professional pharmacy

Mr Whitney stated that pharmacists need the educational background which fits them to meet the medical staff on an equal footing He referred to the economy resulting from the employment of a pharmacist by a hospital He discussed the paper[1] and referred to them in his remarks, which follow in part

"The services that are available by pharmacists are mentioned in one of these papers together with other features of a pharmacist's activities outlined through conference with the medical staff the economical administration of purchases of medical supplies, and the records and control of narcotics and alcoholics which features a properly trained pharmacist in the smaller hospital might include, is outlined on another page They are listed as 'Special Services' offered by some professional pharmacists in laboratories for clinical testing for bacteriological examinations and other public health work assistance rendered to physicians and dentists in their office practice, and so on

These subjects are included in the curricula of recognized colleges of pharmacy and it is a type of service that can be given by a properly trained pharmacist

' Perhaps a recital of some of the things that have been accomplished in our institution may indicate the growing importance of the pharmacists' services " Mr Whitney stated that it was not difficult to have the medical staff concur in the purchase of an ointment mill sterilizing equipment, etc This resulted in doing more and better work this had been largely done by nurses heretofore and their work is now directed to that which is properly in their line The pharmacy at the University Hospital is now as well equipped as a small manufacturing establishment One service has led to another and there has been little resistance especially when it could be shown there was a saving in costs

Prof Louis Saalbach spoke for Mr Gaw of Pittsburgh He is well acquainted with McKennan Pharmacy and the success it has made in interesting physicians and supplying their special needs and prescription work He stated that this institution was developed from what was formerly a commercial store It was taken over by a colleague Mr O F Wolf who converted it into a professional store He was not even a graduate in pharmacy but he had the profession so much at heart that he devoted his entire life to the development of the professional side in that particular store and he has succeeded to such an extent that this store is known from

[1] Copies of these may be obtained from Prof E Fullerton Cook, 43rd St and Kingsessing Ave , Philadelphia, Pa

one end of the country to the other for the character of its practice and its association with physicians The speaker continued

"The Pittsburgh College of Pharmacy has charge of the pharmacy at the Fall Clinic under its direction and supervision One of his associates has direct charge of the laboratory and dispensing room He is continuously called in for consultation by the members of the staff of the Fall Clinic for information regarding the manufacturing of the different types of solutions He has opened their eyes to the things which can be done in a pharmacy and shown them that it is possible to save considerable money in the running of that clinic, which is a charitable institution

' At this clinic there is the opportunity of coming in contact with the medical student of the University of Pittsburgh because it is used largely as a teaching institution The senior class sees the patients and diagnoses the case by the side of the physician who has charge of it They learn how to prescribe and come into the pharmacy to see what the preparation looks like

We feel that we have been doing a wonderful work in a professional line by definitely educating the younger physicians, and the younger dentists with whom we come in contact It might be well to bring to your attention the fact of how far this education can interest the dental profession

Last week, in Pittsburgh, at a State association meeting we were requested to make some kind of of an exhibit The exhibit was made under the auspices of the AMERICAN PHARMACEUTICAL ASSOCIATION, arranged by the members of the staff of the School of Pharmacy At that particular demonstration we interested more than six hundred dentists, and at the same time that we had the demonstration, the manufacturers were endeavoring to acquaint them with some of their preparations

The dentists were greatly interested in the display made by us particularly in tooth powders and other preparations of that kind which the pharmacist can make, even including such substances as temporary fillings, for which the dentists have always supposed that a considerable amount of technique was required They were given a formula and samples of material prepared by the School of Pharmacy and advised that they could take that formula to a pharmacy and have it compounded by the pharmacist in charge

'The dentists assured us that they would ask us again at some future time to make displays of an educational character at their meeting, because they are very much interested in that type of work I feel that the pharmacists of the country can in their own communities, come in contact with their medical and dental organizations and stimulate professional pharmacy along the lines outlined by Professor Cook In my opinion the future of pharmacy and the relations with other professions rests largely in the hands of the younger men who are starting out and who we are trying to put on the right track at the school of pharmacy '

President Swain said the hour was getting late and he asked the speakers to condense their remarks so that all who desired would have an opportunity to speak

Mr Sechrist, of New York felt that every hospital pharmacist can endorse the outline of the report He was of the opinion that if a provision was made for a contact man from a committee to work with the physicians that he could do much in promoting the well being of the hospital pharmacist It is difficult for example to go into the operating room and advise the surgeon what to use, and how much to use He said that at the New York Hospital they have a formulary committee Its inception is due largely to the efforts of Dr R A Hatcher and he has designated various members of the staff to particular positions on that committee who are used as contact men for the surgeon It is largely in that way, by making that contact man feel the need for the things that we are trying to impress Very often it is difficult to contact them, we may try for weeks and miss "

We have the proprietary situation which is to be found in every hospital Some preparations are very expensive and the interne prescribes them frequently and in quantity because the detail man has probably, spent the day before with him, the pharmacist must abide his time "

He was of the opinion that if a certain friendship can be built up among some of the doctors through a committee appointed by the Medical Director that a great deal can be done to promote rational therapeutics Economy has been stressed but after all, especially in research institutions we owe much to the training of the younger men who are going to write prescriptions, they are the ones that really should be guided in the channels of rational therapeutics

Dean Edward Spease did not know he would be called upon to speak and would confine himself entirely to principles, and not to details He said in part

"In Cleveland, for a period of years, we have been working on this problem We felt that true pharmacy, if it is to succeed, must come through the door of the hospital, and a student must be trained there just as the medical man, the nurse and the dentist To that end we have worked with our university hospitals, the pharmacists in the hospitals are on the teaching staff of the School of Pharmacy and they are members of the faculty with university appointment

Once each month the Pharmacy Committee in the hospital meets, it is made up of a representative from each service in the hospital—medicine surgery obstetrics We have no member from the pathology division and we haven't asked for one The pharmacists and the directing pharmacists and those six men consider the medicine that is to be used in the hospitals We do not tell the doctor what he shall use it is a very different procedure We have tried to work out a series of principles, which we know will be an enormous saving to the hospitals we do not say to our medical men that a proprietary is wrong because it is a proprietary or a specialty and should not be made by a manufacturing house It must be demonstrated We are working out and have already recommended our medical council of our hospital group, and the medical council is made up of all these services including pathology and the administration We have recommended to them a policy on medication and that policy I am sure, will be adopted This whole program you will be able to read as it has been accepted for publication It will soon be out and you can then get it, with a photograph of what we are doing I could give you the detail, but I think all you want to day are the principles In addition to that we felt we had to do something with the retail pharmacist, something that we could build upon for the future

So we have formed an Academy of Pharmacy made up of those retailers who want to do the work as is outlined We have had the heartiest cooperation and support from the medical profession of the city three members of our Academy of Pharmacy and three members of our Academy of Medicine have constituted a joint committee to work it out and it has been passed by the Academy of Medicine

' We feel that those are the principal things that we have accomplished during the recent months I have been studying this problem for nearly eighteen years, and have had this relationship with the hospital now for nearly three years and this Academy of Pharmacy for nearly four years, and they recognize us within the hospital group on a basis of equality with the members of the medical profession We have a great many plans for the future which it is unnecessary to go into

As far as savings go of course, it can be put upon that basis, because our savings last year for our organization were somewhere in the neighborhood of thirty thousand dollars That doesn't include entirely the manufacturing of pharmaceutical preparations In our School of Pharmacy we have a control laboratory Those that need to go through laboratory procedure are sent from the hospitals and the man in charge of that is a very practical man a man who has had commercial manufacturing experience

"We are going into the textiles and perhaps, food some of that we do now, we look after the milk creams, etc We have definitely demonstrated to the organization the worth of pharmacy and we have had it in turn expressed to us not only in rank and recognition, but financially "

George Secord said he was very happy to be here this afternoon, and to listen to this very interesting discourse on professional pharmacy He knew of the work that Dean Spease has been doing and that is being done by Mr Gray, and various other hospital pharmacists in Chicago

The work he has been doing is strictly professional, but there have been no special features of development in testing and the preparation of ampuls and similar preparations which are handled for hospitals and the hospital physicians

He said that in the business section of a city there is another factor to be considered While we may devote most of our time to the professional pharmacy, still we do not have the time and the conveniences which are available to those in the hospitals The first element in the city pharmacy attempting to serve the physician and the patient, is to make the business go In my store about twenty nine feet of laboratory space is devoted to the manufacturing of pharmaceuticals and the compounding of physicians prescriptions About sixty or sixty five per cent of the receipts in the store are from pharmaceutical services and the sale of drugs, crude drugs and pharmaceutical preparations

'I highly commend the work which is being done and have hopes some day, after we get out from under this terrific strain of organizing work which has been piling on us for many years to make certain changes in my own business, which will permit of the doing of work along this line I had hopes of that several years ago, but certain conditions determined otherwise, and I have felt since that we have had a great loss "

William Gray said, ' A symposium was given on this subject at the last meeting of the Chicago Branch, A PH A , which I hope will be published in the JOURNAL We gave three different phases I might say, speaking for the Pharmacy Committee in our hospital, they have about one hundred members on the staff, and they supply anything that the medical man wants no matter whether it is for research or other purpose We supply him and give service "

Henry Brown, of Scranton Pa , said that last fall a meeting of doctors, dentists and pharmacists was held in Scranton There was an attendance of about four hundred A number of able speakers took up the various angles of pharmacy He made a display of a number of U S P and N F preparations, a number of dental preparations, a number of treatments that were original Dentists wanted preparations different from the regular standard formulary preparations 'I made one, that was tried out successfully, containing thymol iodine with menthol, and sterilized, excellent reports on that have been received Various antiseptic solutions were prepared The reception was very pleasing, that is, the comments of physicians and of dentists, they have appreciated the various formulas, which were printed on the tubes with the approximate price attached Comparison with the other preparations that they have used was very favorable, they appreciated the display and the returns I checked up on in the county, about two months afterwards, showed that the physicians and the dentists were very much interested in the work that was done and was displayed on that evening

'Before the end of the meeting they had us promise that in a short time, or in a few months about twice a year, we would have another meeting of the same type "

Dean George C Schicks was called on by President Swain He had jotted down a few things as Professor Cook was reading the plan which may, possibly, result in a nucleus for something to be used as a standardization for drug stores throughout the United States It mentions hospitals, and the possibility of pharmacists' employment in such institutions He continued

"I visited at a medical meeting a few weeks ago, where a survey was read which spoke of the drug department in the hospital in many hospitals, and the survey made of hospitals in the large city It brought out the fact that from the sale of drugs in the hospital department there was made a considerable profit, and that profit was used, which amounted to thousands of dollars in some instances to help pay the expenses of that hospital That was something new to me and I listened It may be that that would be an incentive for some hospitals to employ pharmacists, that do not at the present time, so that they may, perhaps, change their medications to those in the U S P and National Formulary

'I am well aware of the fact by personal contact with hospital pharmacists, and that this is a splendid opportunity for retail pharmacists to realize the contribution that the hospital pharmacists can make If we want physicians and dentists to write prescriptions it is very necessary that they be told something about the United States Pharmacopœia and National Formulary prescriptions It is quite necessary that this be presented to them in a form that they can use

"In our own State we are having splendid coöperation from the medical and dental professions, and the medical men have asked us to show them prescriptions They want us to translate prescriptions into a National Formulary product There is real possibility for contributions that the hospital pharmacist can make to the retail pharmacists in teaching these hospital internes the medical men and dental men, the art of writing prescriptions and what to write for

' In New Jersey, a medical man is putting out a phamplet with three hundred prescriptions in it, which will be adopted I understand, by the medical department of New Jersey, and supplied to medical men showing them what to write for, for U S P and N F products in prescriptions

"Most of the speakers have said something about dental men and most of them in a favorable way, showing that there is a real opportunity for prescription writing on their part I know they will write them if they know how to write them The pharmacist who can get them to write them is not the pharmacist who ridicules, but the pharmacist who assists and shows them how to write them in a very constructive manner If the pharmacist goes about it in this way, I

am sure that the dental men will respond Since you have many representatives on this program, if it is possible, I would ask that a representative from the American Dental Association be named in the plan "

President Swain felt that this is one of the most important phases of our deliberations He would like to see the time come when it will be possible to set aside an hour or possibly two hours in each one of these annual conventions of the AMERICAN PHARMACEUTICAL ASSOCIATION for such discussions That a stated period might be set aside just for a clearing of the ideas which have accumulated during the year and the experiences which the various ones have had He concluded by saying that these rather impromptu and sketchy discussions illustrate in a very pointed way just what value there is in having these experts and these men of broad experience in these fields give us the benefit of their own knowledge of the subject

Mr Whitney said he hoped that this might be brought up In an article he had presented in another section, as Dr Schicks has said, dentists are asked or have been asking for assistance He read a statement by Dr Charles B Edmunds, of the University of Michigan in his chairman s address of the Section of Pharmacology and Therapeutics at the Detroit meeting of the American Medical Association ' The pharmacologist cannot be held responsible for instruction in the practice of therapeutics In only rare instances does he have access to the clinic The internes, whether they will or not must be given such training If the practical therapeutic knowledge of recent graduates is limited to proprietary preparations teachers are responsible Their methods of practice are reflected in their students "

After concluding hopeful remarks by President Swain the Second General Session was adjourned

THIRD AND FINAL GENERAL SESSION

The Third and Final General Session of the AMERICAN PHARMACEUTICAL ASSOCIATION was convened at 8 30 P M by President R L Swain The minutes of the Second General Session were read and approved

Moving pictures of convention features were shown by Chairman R W Rodman of the Press Relations Committee and much enjoyed by those in attendance

President Swain stated in behalf of Mr Rodman through whose courtesy the moving pictures were shown of the dedicatory exercises of the American Institute of Pharmacy, that the film will be edited proper headings given to it and it will then be exhibited before the various State Pharmaceutical Associations this summer The film will then be given to the American Institute of Pharmacy for preservation

The final report of the House of Delegates was read by Secretary Kelly

Secretary Kelly said it is customary as a part of this report to request that the chairman of the Committee on Resolutions summarize these resolutions or call them to the attention of the General Session by title

Chairman Leonard O'Connell presented the resolutions by title (See Resolutions in May JOURNAL pages 474–476)

The Chairman moved the adoption of the resolutions, seconded by Henry F Heim The report was adopted by vote.

Secretary E F Kelly said that in accordance with one resolution submitted by the chairman of the Committee, he was requested to submit the following proposed amendment to the By Laws of the ASSOCIATION to carry out the purpose of that resolution That Section 1 of Article III of the By Laws be amended by the insertion of the words 'The Immediate Past-President " the purpose being to make the immediate past president an *ex officio* member of the Council in accordance with the recommendation of President Swain The Secretary stated that under the By Laws it would be necessary for this proposed amendment to lay over to the next session of the ASSOCIATION and be acted upon at that time That will serve to put this plan into effect after this year

President Swain stated that no action is required at this time

The Chairman of the Scientific Section was presented to report on the Ebert Prize

Chairman L W Rowe reported that no Ebert prize is to be awarded this year

L S Williams requested to speak under unfinished business

He hoped the members would not consider it presumption on his part to take the time of

the ASSOCIATION, but he had something on his chest He referred in a happy vein to the fact that he and President Swain were classmates and recounted some of these school events He was proud of the fact that he and President Swain were classmates and spoke in part as follows

'Dr Swain graduated from the College of Pharmacy twenty five years ago this month The class of 1909 watched him when he received honorable mention for merit He was the first one on that list, and that is authentic, because this is a program of 1909 He also won the Simon Medal for superior work in Analytical Chemistry and from then on he has been going up the line

We had a rather small class of twenty three members Six of those members died, six of them are not in Baltimore living in some other state, there are only seven in the City, but we feel very proud of that class One of our classmates is a teacher in the School of Pharmacy in the University of Maryland two of them are former presidents of the Maryland Pharmaceutical Association, one of them has just been appointed by Governor Ritchie to the Board of Pharmacy Our *Honor Man* Doctor Swain, has attained the high office of President of the AMERICAN PHARMACEUTICAL ASSOCIATION

I have been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION for twenty four years, but have only attended two conventions, the one in Baltimore and the one here I didn't have a chance to get into any of the meetings in Baltimore because I was trying to help entertain the visitors, but this year I have attended as many sessions as I could

Mr Williamson said yesterday that he had watched the American Institute of Pharmacy from the time the spade had been put into the ground until it was finished I was unable to get over here when the ground was broken until Tuesday, a week ago I hadn't seen the building and when I drove over and went down Constitution Avenue I sat in the machine and looked with awe at the building

I feel that it is my building as it is your building, I feel that I have vital interests in that building because it represents the highest ideals of pharmacy

I know of the great amount of work that Dr Dunning has done I was sitting rather far back on the steps of the approach listening to the dedicatory exercises, and when I listened to President Swain a lump came up in my throat, and I couldn't help saying to those that were near me, That is my classmate up there '

I feel very proud of you, Dr Swain The class of 1909 is very proud of you, and at this time, the members wish you to accept a little token of its esteem and affection for our classmate Bob Swain "

In responding, President Swain said he wanted the members to share this honor with him so he asked Secretary Kelly to open the package

He referred to Mr Williams as one of the most unique pharmacists he had ever known

"In his drug store in Baltimore City, there is to be found probably the World's finest collection of old pharmacy show globes, so much so that his place has become the center of interest on the part of those who have shown a love for those old pharmaceutical symbols

Not only has he done that but he is starting his second collection of old drug store scales He has some very unique specimens and is fortunate in collecting the history of each and every one of them In addition to that he has a unique collection of old drug store mortars and pestles He seems to have an uncanny ability to collect these things There has not been a drug store closed for years that Lawrence has not made it his business to find out whether there were articles of this kind for his collection Those of you who were fortunate enough to be at the dedicatory exercises noticed in those rooms at the American Institute of Pharmacy some fine specimens of show globes Every one of them was donated by Lawrence Williams to the American Institute of Pharmacy and if you were to go into his store you wouldn t think any of them had been re moved '

President Swain said he greatly appreciated this evidence of esteem of the Class of 1909 and the mere fact that that esteem has survived the stress and the toil of twenty five years makes him appreciate it all the more He referred feelingly to his associates and the class history, he assured them that this occasion would be celebrated in a fitting manner later on

President Swain said that the time had come for the most important and impressive portions of the programs—the installation of officers Before taking up this part of the program, he deemed it fitting to indulge in a two or three minute resumé of the year during which he had been per mitted to serve this organization in the capacity of its president He said in part I feel in the

year of all years I have been honored beyond my merit because it certainly must remain for a good many years to come, one of the most outstanding, if indeed not the outstanding year in the history of this time honored organization

I would like to go back a year or two when the American Institute of Pharmacy had passed from the legendary, visionary days, so frequently referred to and so truthfully referred to by others until the later days of that project when the project was beginning to be launched as an actuality

I remarked last year at the Madison meeting just how fortunately my predecessor, Dr Philip was in having served as a president of this organization during that year in which stone was piled upon stone in such a superbly beautiful manner, that in due course we were permitted to see in actual marble this classic institution which we dedicated yesterday

I have made calls at the American Institute of Pharmacy during the year and on most every occasion I have gone out to the front of it, and I have looked over that tremendously impressive vista and I have turned my back upon the Lincoln Memorial and gazed in silent admiration at that exquisite piece of architecture which we now call Home '

At times in spite of the fact that I actually saw it in spite of the times when I have been face to face with it I could actually reach up and touch the coldness of its marble, and I have sometimes almost questioned whether or not the thing is actually there So it is not often given to people to see the realization, the actual consummation of their wishes so devoutly to be desired but this year and the year preceding saw slowly but persistently this achievement of this Asso CIATION

It shall ever be my most cherished memory to have presided over this organization during its dedicatory exercices '

President Swain continued Some writer has said that the most permanent thing the only permanent thing in this journey we call life, is change That is a rather trite statement but if you will for a moment grasp the suggestion, change is pretty nearly the only permanent thing that we have And so now I come to a changing of the ways, to the crossroads as it were

' As I stand here on this particular occasion and at this particular moment I represent the eighty second person who has relinquished the honor of the presidency to another

I don t know just what I should say as to what my emotions are but I am conscious of a rather commingling of emotions I can say frankly, when looked at from one point of view, that I rather regret—I might say quite truthfully that as I pass the gavel over to my successor worthy as he is I do it just a bit reluctantly, and that reluctance is not because there is any doubt in my mind as to his great ability to carry on the work, certainly as well as I have done and perhaps a little better but because it will necessarily prevent me from associating as closely and as intimately with a man with whom I have been permitted to associate with rather intimately over the last twenty five years And while, as he knows this will not in any sense mark any break in the friendship between Dr Kelly and myself the part that I regret is that I will not be able to see him quite as frequently as I have in the past '

He referred feelingly to the sterling qualities and efficient services of Secretary Kelly his unusually genial and kindly demeanor and his high place in pharmacy

President Swain continued As I have looked back over the history of this organization I sometimes have felt that possibly presidents might be more or less of a nuisance They come for a moment they bask in the sunlight and then pass on And yet when I think that they might be considered a nuisance I am impressed with a tremendously important accumulation of this material which is to be found in the YEAR BOOKS and the PROCEEDINGS of this ASSOCIATION, and then I am conscious of a deep feeling of admiration for the men who have served as the presidents of this organization during the last eighty-two years

I wish it were possible for some person with the proper touch and the proper management and the proper use of words to go back over that vast accumulation of material and edit it, bring to life probably in a volume or two, the gems with which this entire list of books is interspersed

Now I am about to pass out of this chair, so far as the presidency is concerned, and I want to give you just very briefly some little definite interpretation and it will only be very briefly I said that I would relinquish this gavel with a certain amount of reluctance but looking at it an another way I am looking at it in that way with a certain amount of pleasure I *find*

that and I rather suspect, that every person who has served as the president of this organization has had exactly the same reaction

' There have been times during the last eight months when I have been tempted on more than one occasion, to give expression to feelings which I knew I could substantiate with facts, give expression to conclusions and impressions which I knew were absolutely the truth, but yet I always felt on my shoulders a restraining hand I always felt a sense of responsibility, that perhaps through some peculiar interpretation or misinterpretation of what I was going to say might work to the disadvantage, it might work to the detriment of something far larger

"If there is anything a person learns from going through the office of the president of the AMERICAN PHARMACEUTICAL ASSOCIATION, it is a sense of responsibility, and one of the finest things about it all is that the traditions, the history, the accomplishments, the ideals, seem to stand by you as restraining hands So, if by any chance I have broken through and done anything at all in an official way that might possibly be considered as not to the interest of the ASSOCIATION, ascribe it if you please to a complete lack of knowledge on my part that it would have that implication or that effect "

I am going to repeat what I have said about an hour ago to a former president of this ASSOCIATION, and as I said in my presidential address, that to be asked to serve as a president of this organization, even within the brief period, is certainly the greatest distinction within the power of pharmacy to give, and to have been thus honored at your hands for a brief period shall always remain my most cherished memory "

President Swain requested L L Walton, a former president, to again serve as Master of Ceremonies He asked that the elected members of Council be presented for installation H A B Dunning S L Hilton and W Bruce Phillip

The Master of Ceremonies said "Mr President, I have the honor to present to you this triumvirate, three gentlemen whose services to this ASSOCIATION have been so highly valuable that I haven't words sufficient to express them I can assure you that the work of the ASSOCIATION will continue to progress as it has in the past "

They were duly installed

The first vice president, George D Beal, was presented for installation, as the distinguished son of a distinguished pharmacist

The second vice president, Oscar Rennebohm was presented by proxy, A C Taylor representing him

C W Holton was declared installed as treasurer

The Master of Ceremonies presented E F Kelly for installation as secretary

President Swain considered it more than an honor, he considered it a deep personal privilege to install Secretary E F Kelly

President Swain regretted, due to absence, that it was not possible to install the honorary president, J K Lilly

The Master of Ceremonies then presented the president elect Robert P Fischelis, he said "For a number of years, I have looked forward to the day when we might have as president of this ASSOCIATION, Dr Robert P Fischelis He has rendered many distinguished services for this body and in other respects and notwithstanding the very high standard of your administration which you are now about to complete I believe in handing the work over to him, that it will be maintained with credit to himself and with honor to pharmacy "

President Swain said it had been his privilege to know Dr Fischelis for a number of years As colleagues and in the National Association of the Boards of Pharmacy he had learned to appreciate his ability, his sometimes uncanny understanding of problems, and a seeming ease with which he worked out difficult problems He stated

' Just a short while ago, I was working my way through some of the early (about twenty five or thirty years ago) proceedings of the AMERICAN PHARMACEUTICAL ASSOCIATION, and I was a bit surprised, and equally as much delighted to find out that even in that early day, the papers were finding their way into the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION and the YEAR BOOK, and the PROCEEDINGS of the AMERICAN PHARMACEUTICAL ASSOCIATION from the pen of our president elect

'During that time or since those years, he has held a number of important pharmaceutical positions, any number of which might be considered a sufficient reward for pharmaceutical effort

and taken altogether, present a very impressive record of accomplishment for a person who has not yet reached middle age

And so in passing this emblem of office over to Dr Fischelis as a president of the AMERICAN PHARMACEUTICAL ASSOCIATION, let me state to him quite frankly and quite proudly that I know that honor is not unknown to him

'Let me state also quite proudly and quite frankly again, that I entertain not the slightest misgivings as to the high standard of services he will render to this organization A careful study of the work the man has done, and a careful study of the principles for which he has consistently stood and an equally careful study of the courage which he has on several occasions manifested in his activities in the State of New Jersey, where he has established himself as a great leader of pharmaceutical opinion will show you that underlying it all has been a deep sense of responsibility and an unusually intelligent grasp then of the direction in which he wanted things to move I consider it not only as a pleasure but a privilege to be able to greet a friend of many years' standing and to place upon the lapel of his coat this insignia of honor"

The presentation was made and the members arose and applauded and then President Fischelis turned the gavel back to President Swain to conclude this meeting

President Swain said A distinguished statesman of the State of New Jersey knowing of this event, has expressed the desire to me to be present, and to participate Whether he wants to reflect his glory upon Dr Fischelis or whether he wants to bask in Dr Fischelis' glory I do not know, but at any rate I am going to present to you for whatever remarks the gentleman may desire to make, the Honorable Delain Powers, Congressman of the Fourth Congressional District of the State of New Jersey

Dr Powers replied that President Swain asked him about a half an hour ago to make a few remarks on this occasion He said

"I have the profound honor this evening and the distinctive privilege, Dr Fischelis, to present you, my friend my neighbor, my fellow townsman, a life membership in the New Jersey Pharmaceutical Association This, Doctor Fischelis is given you by the Association, because of the hours, days and the years of toil in their behalf I know that I am expressing the wish of every member when I say to you, Dr Fischelis that we are proud of you, New Jersey is proud of you, and we wish you the utmost success in this your latest honor"

President Fischelis replied 'I greatly appreciate this presentation, and particularly appreciated the fact that this Association has asked you to come here and present it to me'

Secretary Kelly spoke as follows 'I would like to express to the retiring president my sincere appreciation of the kind references he made to me, and to assure him that it has been just as great a pleasure for me to serve during this year with him, and I am sure we shall find it an equal honor to serve under our incoming president"

"This has been a very unique experience for all of us this week, and we have had the pleasure of taking part in exercises that are very uncommon to even an organization of this distinction, and of this age

'I couldn't help but be impressed the other day during the dedicatory exercises, with the thought that we were not only dedicating a building, but we were continuing the work of a great many distinguished pharmacists both men and women who preceded us I couldn't help but think of the great satisfaction I know many of them would have had in that great occasion

'It seems to me that in a certain sense we were copying their careers and I hope that those who had the privilege of seeing this can realize what a great happiness it was to do that

'In addition to other unique experiences this week for me at least I have been asked to perform a very unusual duty, or to convey a very unusual message In a peculiar sense it is a distinction to be requested by your Father, President Fischelis, to present for him to you, a message of congratulations and good wishes

"I don't know when I have had a greater honor than to represent the father of the new president I would like to read this telegram

My dear Robert Hearty congratulations to you on this occasion and best wishes for a successful term of office Your happy father'"

I take great pleasure in shaking hands with you as the representative of your father"

President Robert P Fischelis responded

Dr Swain Fellow Members and Friends No one who has been present at our meetings this

week and at our dedicatory exercises on Wednesday can help being impressed with the responsi bilities that will go with the presidency of this ASSOCIATION in the coming year Of course, I realize in taking over the office that the active routine work of the ASSOCIATION is well taken care of by our good Secretary our conscientious Editor and by the members of the Council and others who will function as they have in the past

Nevertheless there is a certain responsibility for leadership which naturally comes to the presiding officer It is my hope that in the coming year I may be able to meet these responsi bilities as they come, with some degree of satisfaction to you

I am happy to night to see here in this group some of the people who perhaps remember when I first became active in pharmaceutical association work in my native state Pennsylvania It was my privilege to work there with some of the leaders who have since passed away but who were then doing the big things which we are still talking about to day and which we are pointing to as part of our splendid heritage

It is particularly gratifying to me to have had Dr Walton present me to the President for installation He has been my mentor on many occasions and I owe much to his encouragement and advice I see also Louis Emanuel and Samuel C Henry who were then very active in the Pennsylvania Pharmaceutical Association and my good friends Mr and Mrs Peacock, who not only at the State conventions but at other times in the City of Philadelphia gave me their kind and helpful advice There are of course many others who have helped me in the years gone by and upon whom I expect to call in the coming year in behalf of the ASSOCIATION

Now, I know you do not expect a speech at this time and I do not intend making a formal or even an informal address However I do feel there are thoughts about the future in all of our minds and perhaps you should know a little bit about the way I am thinking about some of our problems

The Headquarters Building has been dedicated It is now occupied by our officers The glamour of the dedication ceremony and the publicity connected therewith will soon be matters of memory The building of course will stand always as a monument to all that is fine in phar macy, all that we expect in the way of professional progress I look upon it however from this time on more as a living pulsating thing the source of a stream that will energize and accelerate the life blood of the body pharmaceutic

I visualize it as a coördinating agency not displacing any worth while activity that is go ing on elsewhere, but doing that which we have so long lacked in American Pharmacy namely bringing to a focus these various activities so their full force may be felt wherever and whenever it is necessary to impress upon our people the importance of the tasks in which we are engaged

I was impressed this week with the discussions in the various Sections and in the House of Delegates I did not take very much part in them because I was listening intently

I think it is absolutely necessary for us to keep our finger on the pulse of American Phar macy We know we are not only in a transition stage in our own profession but also in the gen eral affairs of life and I feel that something must be worked out of all of the things that we have planned which will give encouragement to the men and women who are laboring in the field of pharmacy, far removed from the things which we have seen and done this week but nevertheless affected very much by them

Something has been said about increasing our membership and I am of course very anxious to see that the membership is increased It was of interest to me to note the many suggestions made that membership in the AMERICAN PHARMACEUTICAL ASSOCIATION should mean something more than just belonging to the ASSOCIATION that it should be more or less of a badge of distinc tion in American Pharmacy, and for that reason I feel we should give consideration to creating something distinctive about the membership

It may be worth considering the plans used by the American Association for the Advance ment of Science, the American Public Health Association and the American Medical Association where general membership is open to anyone but where there is a second or higher classification Members may qualify as fellows" and this classification carries with it additional dues and the privilege of holding office and serving on committees I think that sooner or later we shall have to study very carefully some revision of our membership classification

We have had an unusual meeting and the dedicatory exercises of course have been the high point Next year's meeting will naturally be different from this one and we are looking ahead to

Portland, Oregon, as the next stop in the line of stations along the highway this ASSOCIATION is traveling I am glad we are going into more or less virgin territory for we shall have an opportunity to do some constructive work in bringing to the people on the West Coast the activities of the AMERICAN PHARMACEUTICAL ASSOCIATION I hope that all of you will coöperate throughout the year and endeavor by your interest and attendance to make the Portland meeting an outstanding one President Swain and his co-workers have set a very high mark for his successors to shoot at but we are going to do our very best

It is very pleasing to have as our First Vice President Dr George Beal whom I count among my friends and on whom I know I can call when necessary to assist our progress during the year

I am hopeful that the Council will so arrange its business that sometime during the year, there will be a meeting, at which we can perhaps submit progress reports, and map out certain activities more definitely and obtain consent to carry them out I am also hopeful that I may be granted a page or two in each issue of the JOURNAL to maintain a monthly contact with the membership

Dr Swain, I greatly appreciate your remarks regarding my work, and you need not feel for one minute that you are going to rest easy in the coming year I intend to avail myself of your advice and counsel and I know that Doctor Kelly already expects that and he is not going to be disappointed

Announcements were made by the Committee on Entertainments

There being no further business the Chair declared the Eighty-Second Annual Convention of the AMERICAN PHARMACEUTICAL ASSOCIATION adjourned

---

ABSTRACTS OF PAPERS PRESENTED BEFORE SECTION ON EDUCATION AND LEGISLATION A PH A, WASHINGTON MEETING 1934

'Research in Pharmaceutical Education," by W J Husa

In pharmaceutical education a great deal of attention has been given to improvements in curricula and teaching methods There is one phase of pharmaceutical education whose paramount importance must never be lost sight of, *i e*, the correctness of the material that is taught A discussion is given of the factors involved, such as the training of the teacher and the accuracy of available text and reference books The importance of research carried out for the improvement of teaching is stressed Examples are given of successful research of this type which has cleared up discrepancies in the textbook and thus has lead to improved teaching

'Amendments to the Federal Food and Drugs Act Proposed by Doctors Wiley and Kebler Nearly a Generation Ago,' by L F Kebler

This paper calls attention to various amendments that were proposed and embodied in Representative Richardson's bills in 1911 and 1912, after President Taft urged amending the Food and Drugs Act to provide for the breach caused by the United States Supreme Court decision The amendments in brief cover all advertising separate and apart from the package, therapeutic devices, cosmetics, increasing the number of drugs to be declared on the label and a method for controlling irresponsible parties sending medicines direct to the consumer The hearings held on the bills are briefly reviewed and attention called to the procedure that resulted in amending the law by including the phrase "False and Fraudulent" This phrase is now much discredited although at the hearing it was considered an all-sufficient cure for the injury caused by the decision Dr Wiley and Dr Kebler did not favor this amendment

'Demonstrating the Practical Application of Subjects in the Pharmaceutical Curriculum," by V Lewitus

The writer indicates how, by means of a simple experiment carried out by pupils in the drug store, as part of the introductory lesson in materia medica, students will convince themselves as to just what proportion of the theoretical training they are about to undertake will actually come into play as a part of their every day duties in the drug department The students keep a tally of each sale over a period of one day, and classify these under the headings of Chemistry, Pharmacy and Materia Medica, the latter including toxicology This inventory furnishes them with evidence which establishes the worthwhileness of the major subjects in the pharmacy curriculum

HOUSE OF DELEGATES, AMERICAN PHARMACEUTICAL ASSOCIATION

ABSTRACTS OF THE MINUTES OF THE SESSIONS HELD IN THE SHOREHAM HOTEL, WASHINGTON, D C, MAY 7–12, 1934

The First Session of the House of Delegates was convened by Chairman P H Costello at 1 30 P M, Tuesday, May 8, 1934, he welcomed the delegates present The roll call showed that a quorum was present and the House of Delegates was declared organized for business

The names of delegates and organizations represented follow The name of the organization or state is in Italics names of delegates in capitals and small capitals, and the names of voting delegates in bold face

The minutes of the House of Delegates are printed here and to avoid duplication in printing will also answer for the reports of the transactions made to the General Sessions—the reports are abstracts of the minutes

The names of the delegates follow

A PH A SECTIONS

Scientific—W J Husa Gainesville Fla F E Bibbins Indianapolis Ind
Education and Legislation—W H Rivard, Providence R I, George C Schicks Newark N J
Practical Pharmacy and Dispensing—L Walt Rising, Newark N J H M Burlage Chapel Hill N C F S Bukry, Lincoln Nebr Anton Hogstad Jr St Louis Mo
Commercial Interests—J A J Funk, Galveston Ind R W Rodman New York City
Conference of Pharmaceutical Association Secretaries—William B Day, Chicago Ill
Conference of Pharmaceutical Law Enforcement Officials—Frederick C A Schaefer, New York City
National Conference on Pharmaceutical Research—George D Beal, Pittsburgh Pa Dr Wm J Husa Gainesville Fla J C Krantz Jr Baltimore Md

A PH A BRANCHES

Baltimore—B Olive Cole, Jelleff Carr
Chicago—R E Terry, Wm B Day Wm Gray C M Snow I A Becker
Cincinnati—Frank H Freericks Bernard Kotte Charles G Merrell T H Rider
New York—Hugo H Schaefer, H V Arny C P Wimmer
Northern New Jersey—Ernest Little, George C Schicks Adolph F Marguire Lloyd K Riggs O P M Canis
Northwestern—F J Wulling
Philadelphia—E F Cook F H Eby
Pittsburgh—C Leonard O'Connell, J A Koch E C Reif

NATIONAL ASSOCIATIONS

American Association of Colleges of Pharmacy—C M Snow R T Lakey
American Drug Manufacturers—F O Taylor F E Bibbins
American Pharmaceutical Manufacturers—C E Vanderkleed
Federal Wholesale Druggists Association—Paul Pearson R E Lee Williamson
National Association Boards of Pharmacy—C F Allan George W Mather H W Parker Leon Marr
National Association of Retail Druggists—J W Dargavel, Thomas Smith J A Goode G L Secord
National Wholesale Druggists Association—E L Newcomb, H D Faxon
Proprietary—E F Kemp

STATE ASSOCIATIONS

Alabama—L C Lewis W E Bingham
Arkansas—H W Parker
Colorado—C J Clayton
Connecticut—E J Murphy, H P Beirne
Delaware—G W Rhodes
District of Columbia—T A Moskey, R W Lusby M G Goldstein W P Herbst
Florida—W M Hankins
Georgia—R C Wilson, C H Evans W S Elkin Jr
Illinois—William Gray, R E Terry C M Snow W B Day
Indiana—F V McCullough, F W Meissner.
Iowa—Otto A Bjornstad, J W Slocum
Kansas—Roy C Reese, Frank A Milne Roy M Riley W Mac Childs
Kentucky—G L Curry J W Gayle R A Gayle.
Louisiana—Lawrence Ferring
Maine—B K Murdock C S Pierce L H Mare
Maryland—L V Johnson, A F Ludwig
Massachusetts—Martin E Adamo, Wm H Glover
Michigan—J J Burniac
Minnesota—F J Wulling, J P Jelinek W C Muesing
Montana—Leon Richards
Nebraska—R A Lyman
New Hampshire—T J Bradley
New Jersey—R P Fischelis C W Holton P R. Loveland
New York—C P Wimmer, W C Anderson
North Carolina—I W Rose, E V Zoeller
North Dakota—Mattys Jongeward Nels N Brakke P H Costello
Ohio—F H Freericks M N Ford F H King
Oregon—A O Mickelsen
Pennsylvania—R R Gaw, H V DeHaven G F Schacterle
Puerto Rico—R L Irizarry
Rhode Island—G A Vars J J Gill
South Carolina—J M Plaxco
South Dakota—F L Vilas Rowland Jones
Texas—W D Adams, W H Cousins H F Hein
Vermont—W B Shangraw
Virginia—W G Crockett, G L Miller Roy Crouch H S Falconer R G Barr
West Virginia—J L Hayman R B Cook E K. Hoge G O Young
Wisconsin—E J Ireland, R W Clark
Wyoming—R C Schultz

THE COUNCIL

S L Hilton J H Beal, C E Caspari, C H LaWall H A B Dunning H C Christensen Ambrose Hunsberger, Walter D Adams H V Arny R. L Swain, R P Fischelis J C Krantz, Jr, E F Kelly, C W Holton, E G Eberle A G Du Mez P H Costello

FRATERNAL DELEGATES

Brooklyn College of Pharmacy—F C A Schaefer, New York City W C Anderson Brooklyn

Secretary Stanbury of the Canadian Pharmaceutical Association was recognized and extended greetings and best wishes from the pharmacists of Canada

Chairman Costello thanked Secretary Stanbury

In the absence of Vice Chairman Williams, former Chairman Slocum was requested to take the chair while Chairman Costello read his address which was under the By-Laws referred to the Committee on Resolutions See pages 454–456, May JOURNAL, A PH A

Chairman Costello announced the appointment of the following committees

Committee on Nominations *Chairman*, W B Day, Illinois, Walter D Adams, Texas, H H Schaefer, New York, Wesley McClung Childs, Kansas, A Ziefle, Oregon, M N Ford, Ohio, R C Schultz Wyoming, G W Rhodes, Delaware, N N Brakke, North Dakota

Committee on Resolutions *Chairman* C Leonard O'Connell, Pennsylvania, Rowland Jones, South Dakota, John W Slocum, Iowa, A O Mickelsen, Oregon, R B Cook, West Virginia, R C Wilson, Georgia, W P Herbst, District of Columbia, W N Hankins, Florida, W H Rivard, Rhode Island

Upon request the reports of the Council and of the Treasurer were deferred until the Second Session The report of the Secretary was read and accepted for publication

REPORT OF THE SECRETARY

June 30, 1933 to April 30, 1934

This report will cover a short ASSOCIATION year and one of more than usual importance It will be limited so far as is possible, to such matters of interest as are not dealt with in the reports of other officers and of the special and standing committees As the Secretary's office cooperates with the officers and committees of the ASSOCIATION, a good part of his work is reflected in their reports

From the viewpoint of its general activities, the year closing with this meeting has brought improved conditions for the ASSOCIATION as compared to those of the preceding year and although the conditions are still far from satisfactory, there has been a decided change for the better, with indications that the improvement will be continued It has been necessary, due to reduced income from membership and other sources, to continue the reductions previously made in the operating budget, and to defer or forego activities which should have been undertaken As reported last year, it has not been necessary to discontinue or materially reduce any important activity and some new ones were begun

Considered altogether, the ASSOCIATION has come through the recent trying times very satisfactorily and, again the credit can be given to those who long ago determined its objects and policy and built up its very sound economic structure, to its interested and loyal members who have supported it so faithfully and to the officers who have administered its affairs so conservatively

The ASSOCIATION has also undergone during this year, a fundamental change in occupying for the first time in its more than eighty years of existence, its own home No estimate can be made of what pharmacy and the ASSOCIATION have lost during these years, through the lack of a home of its own where the wealth of historical material that it has possessed at some time could have been preserved where the various organizations promoting the profession of pharmacy could have been consolidated and provided with the required equipment and personnel, and where other activities so necessary to the advancement of our profession could have been developed

A splendid foundation has now been laid in the building and grounds which we are dedicating and a good beginning has been made toward utilizing them The partial occupancy of the building represents a great effort and future progress will be more apparent With the improved facilities now available, one may expect greater interest and greater results It is most encouraging to record that the ASSOCIATION during such disturbed times has carried this work to a completion which is beyond our earliest dreams and has been able to meet the increased expenses incidental thereto through its accumulated reserves

The 1933 Meeting—Following the usual procedure, the proceedings of the meeting were fully reported in the next three numbers of the JOURNAL, in this case the September, October and November 1933 issues, they were also reported in the pharmaceutical press and to a limited extent in the daily press

Our custom is to report the addresses of the officers, the proceedings of the Council, and the resolutions in the issues of the JOURNAL following the meeting, the proceedings of the General Sessions of the House of Delegates, the American Association of Colleges of Pharmacy and the

National Association Boards of Pharmacy in the second issue, and the proceedings of the five sections and three conferences in the third issue A complete report of the meeting thus reaches all the members within three months The papers presented at the meeting are published, as far as this is possible, throughout the year The number of papers presented and the interest in the work of the sections and conferences is steadily increasing and, while this result is encouraging it is becoming embarrassing These contributions must not be discouraged but it is necessary that the contributors economize in time and words as much as can be done The ASSOCIATION should as far as is within its power, provide the place in its program and those of its branches and in the publications for every discussion and proper dealing with pharmacy in order that its records may provide, as heretofore a complete review of the progress of the professions Such a comprehen sive plan, however, is expensive, and requires careful planning and supervision if the result is to be creditable to the profession

The ASSOCIATION is deeply indebted to the officers of the state association, to the officers of its affiliated organizations, to the officers of the sections and conferences and to the officers of the branches for the thought and effort which they give to the professional work carried on for phar macy during the year as well as at the annual meetings of the ASSOCIATION This work is more extensive and more fundamentally valuable than is generally appreciated by pharmacists or by the public

The pharmaceutical press should also be commended for the space and attention they give to professional pharmacy, and for the increased emphasis they place on the necessity for a sound professional policy

The resolutions adopted at the last meeting were promptly sent to the publications, to the state and national associations, to the boards and schools of pharmacy and to others interested The accompanying request that those resolutions of concern to each group be supported has been more generally complied with each succeeding year

Even though our annual meetings are well reported it is important that each delegate make a carefully prepared report of the meeting to his association and it is respectfully suggested that these reports do not deal with details but that they explain the accomplishments of the ASSOCIATION during the year and its plans for the future If each organization represented here should receive such a report, the work and influence of the ASSOCIATION would be better under stood and more generally supported by individual pharmacists

The 1934 Meeting —The District of Columbia Pharmaceutical Association promptly under took the arrangements for this meeting There was a serious delay due to the difficulty of deciding on the time for the meeting Governmental and other unusual activities have crowded the hotel accommodations of Washington beyond expectations However, the officers of the Committee on Arrangements, the Local Secretary and others interested have worked hard to make their visitors comfortable and happy as they trust will be the case The contributors and others who have cooperated so well deserve our sincere appreciation

The only changes in the standard program for this meeting are those made necessary by dedication exercises and the award of the Remington Medal The time allotted to the three divisions of the ASSOCIATION—the Council, the House of Delegates and the Sections and Confer ences—to carry on their work is now so crowded that it was not considered wise to curtail it even for such an important occasion

It was therefore decided to make such changes as were required, in the program of the Gen eral Sessions The dedication exercises proper will take the place of the first General Session usually held on Wednesday morning

The General Program —It is recognized that our program has developed into such a com plicated one as to be confusing to those not experienced To carry it out requires so many con current meetings of sections and conferences as to prevent attending all of them even for a short time It is already necessary for three affiliated organizations to hold their meetings in advance and if the present growth continues it will soon become necessary to consider either further sub divisions or the extension of the meeting over a longer period than one week

From my close contact with each subdivision now existing, I do not believe that any one of them could be spared as each is doing a necessary work Some consolidations might be worked out to good effect In the meantime, the patience and cooperation of those attending our meet ings are requested and will be deeply appreciated

The Headquarters Building—This subject will be given major consideration in other addresses and reports to be submitted later in the meeting The offices of the ASSOCIATION heretofore located at 10 West Chase Street, Baltimore Md , were removed to the Headquarters Building 2215 Constitution Avenue during the first week in January Although the building was officially accepted from the contractors on September 14, 1933 it was thought advisable not to occupy it until January 1934 in order that any minor defects which appeared might be corrected

Time and care have been taken in equipping and operating the plant, and in landscaping and planting the grounds These important phases of the undertaking are only partly completed as will be observed and they should not be completed hurriedly This is especially true of the library and museum which are comparatively new activities for the ASSOCIATION Only by experience can we learn how they can be made most serviceable, and how to avoid duplicating facilities already available in this wonderful city

We have operated the building long enough to learn that the annual cost will be surprisingly small considering the character and size of the building, the extent of the grounds and the superb location The low cost of operating is due to several causes First and most important the ASSOCIATION as a professional and scientific organization, not operated for profit, is exempted from taxation of any kind Then the building was constructed of the best materials and under very careful supervision and workmanship The plans for the grading and planting of the grounds were revised several times to simplify them and to reduce the initial cost

In addition every effort has been expended to eliminate the need for elevator and other special services, and by adopting automatic features wherever feasible The heating plant, the telephone service and the sprinkler system for the grounds are automatic in whole or part

The result is that the total cost of operation will not be a burden to the ASSOCIATION especially if the other professional organizations that are expected to later occupy the building bear a reasonable share of the operating cost

Under the tax exemption it is not permitted to accept rental from the building but affiliated professional organizations may bear their share of the actual operating cost The operating cost referred to does not include the maintenance of the library or museum or other added activities which must be supported by separate funds

The architects both of the building and grounds, the builders the firms that did the grading and planting and the furnishing have cooperated splendidly and were keenly interested in seeing that the work was in keeping with the character and location of the project

I should like also to record appreciation of the interest and support of the Commission of Fine Arts, the National Capital Park and Planning Commission the Commissioners of the District of Columbia, the Congress and the President of the United States As our purposes and plans were made known we have had splendid support and encouragement from those connected with the enterprise, and full recognition from the Government

For several years the completion of the building and grounds has required a great deal of thought and attention From this time, the splendid facilities provided should facilitate the work of the ASSOCIATION and should enable it to broaden and increase the scope of its activities This result will require the consolidation, in the institution, of the organizations and personnel now engaged in promoting professional pharmacy thus developing the closely associated directing group that our profession has so badly needed This first step of consolidation will add but little to the financial burden as many duplicating expenses can be eliminated

The power of a well-organized group representing as rapidly as this can become possible, the various professional organizations now affiliated with the ASSOCIATION is difficult to estimate This task and that of financing additional activities should have the active interest and support of all who are concerned with the preservation and the future development of pharmacy

The Progress of Pharmacy—However contradictory this statement may seem, in view of present conditions pharmacy as a profession is making steady progress

The four year course based on high school training is now in effect with few exceptions The number of schools and colleges now 67 is not too high although they could be distributed to better advantage The total number of students in 1931 was about 9900 and of this number about 2900 were graduated Probably both numbers are greatly reduced in the present year Considering the number of registered pharmacists in our country the number of pharmacists graduated annually will not replace the normal losses taken as a whole and over a period of time

Just now the conditions are, of course, abnormal With prerequisite laws in effect in forty two states and the District of Columbia and with the return of normal conditions, the excess of registered pharmacists should soon be corrected As it is, the unemployment and distress as reported to the ASSOCIATION is not so acute as in other professions The reasonable control of entrants into our profession should have careful investigation and study

There is evidently a growing interest in professional pharmacy among dispensing pharmacists, both in private practice and in institutions The demand for information on professional phases is increasing and guidance in this connection is a splendid opportunity for the ASSOCIATION

The laws now in effect in the states for the regulation of the private practice of pharmacy are reasonably adequate but enforcement of them is a subject of major importance Pharmacy should be represented on each board of health and on every agency regulating the profession Arrangements have been made for the compilation of a case book concerning court decisions affecting pharmacy and such a work should be of great value in this connection

The regulation of the practice of pharmacy in hospitals and institutions has not been so satisfactory Many of these institutions have not observed the state laws regulating the handling of drugs and medicines After a careful study, the ASSOCIATION decided that the best way to correct the situation was to request that a requirement covering pharmacy should be included among the requirements or essentials governing the admission to the list of registered hospitals of the American Medical Association

Our request has just been granted and in the recently published list of Essentials is one entitled 'Pharmacy" and requiring that ' The handling of drugs shall be adequately supervised and shall comply with state laws," which means that the practice of pharmacy in hospitals will in time conform to the same requirements as in drug stores This step represents splendid cooperation between the two professions and means much toward the protection of the public When the practice of pharmacy in the Army and Navy is placed on a satisfactory basis the entire field of practice will be on about the same status for the first time

Pharmacy and the Government —The relations of the ASSOCIATION with various divisions of the National Government will become even closer with the location of its offices in Washington

As previously reported, those who enter the Government service on a Civil Service status are now on a professional basis This applies to the Veterans' Administration, the Food & Drug Administration and to the various bureaus and divisions in which pharmacists are employed

In the three military branches, pharmacists have commissioned status in the Public Health Service are privates and non commissioned officers in the Army, and chief pharmacists in the Navy rank with that below ensigns The status in the Public Health Service is satisfactory although the number of commissioned positions is too small The situation in the Army is entirely unsatisfactory and that in the Navy, while much better, is not satisfactory

The ASSOCIATION, with the coöperation of other pharmaceutical organizations will not be content until pharmacy is placed on the proper basis in all three branches of service It is, of course, equally important to have available pharmacists with such training and experience as will ensure the satisfactory discharge of the duties expected of them The advancement in its educational standards has done most to change the attitude of the Government toward pharmacy

The ASSOCIATION has been deeply interested in the various measures proposed to amend or rewrite the Pure Food and Drugs Act It has coöperated closely with the National Drug Trade Conference in its efforts to promote a reasonable revision of this measure It will be recalled that this ASSOCIATION proposed and promoted the organization of the National Drug Trade Conference with the view that such an organization representing, as it does, every division of the profession and industry, would be an effective body to deal with matters of mutual interest and which are non controversial among its members In line with this policy, this ASSOCIATION has not taken individual action but has supported the Conference Its officials have also worked in close contact with representatives of the U S P in order to safeguard the interests of the Pharmacopœia and the National Formulary in connection with the proposed legislation As other officers of the ASSOCIATION will deal with this question in detail no further reference to it is necessary here The ASSOCIATION's delegates to the Conference for the present year are James H Beal S L Hilton and your Secretary

Other officers will also deal with the very important matter of the so called Retail Drug Code and the relations of the ASSOCIATION to this movement As is generally known, the Asso

CIATION supported the Code presented by the National Association of Retail Druggists When the amended Code was finally approved the ASSOCIATION was named as one of the organizations to be represented on the National Retail Drug Code Authority and your Secretary was selected by the Council to act as the temporary representative and was later elected Secretary-Treasurer of the Code Authority

The work has been interesting if at times discouraging and our aim has been to support in every possible way the efforts of all who are interested in improving conditions for the retail druggists and through them, for the entire profession and industry

Although the Code is intended primarily to promote trading and industry it has a very definite influence on the arts sciences and professions The provisions with respect to wages and hours, and to collective bargaining, have a very important bearing on professional pharmacy In the President's Agreement, pharmacy was definitely recognized as a profession and exempted from the Code This position has been modified in the Code and the results are not yet fully ap parent

For these reasons, professional organizations must be interested in codes and the NRA Furthermore we are affected by the provisions and the operations of other codes and our welfare can be protected only by watchful care This work has required great attention and much time which have very naturally, interfered with the routine work of the ASSOCIATION and became neces sary just when many other matters of pressing importance required attention If the delegates should desire additional information with respect to the Code, I shall be pleased to discuss it fur- ther at a later session of the House

As reported previously, the ASSOCIATION coöperated with the Department of Commerce in printing the ' Professional Pharmacy" in the July, August, September and October issues of the JOURNAL Reprints have since been made available and we are encouraged by the sales which have now practically reimbursed the ASSOCIATION for the actual cost of the printing This is a comprehensive study of the establishment and operation of a professional pharmacy and furnishes detailed and dependable information not heretofore available It represents a valuable addition to the survey and studies of pharmaceutical practice which to the ASSOCIATION is promoting, and a practical example of the coöperation which can be mutually advantageous to the Government and the ASSOCIATION

This brief review of our relations with certain branches and operations of the Federal Government, and there are many others, should emphasize the necessity for a more compact and representative professional organization of pharmacists

The State and National Association —Due to the unusual demands on their time, the officers of the ASSOCIATION were unable to visit as many meetings of these associations as in preceding years However, an effort has been made to have the ASSOCIATION represented as far as possible by an officer or some interested member These contacts are most important and the cooperation of the delegates here is requested in acting for us wherever possible

Membership —The membership has been further reduced during the year but there is evi dence that the improved general conditions are being reflected in the reduction of losses recently Since the last meeting, 24 members including 1 Honorary and 3 Life Members have died 20 have resigned and 453 have been suspended for nonpayment of dues In the same period, 253 members have been elected on payment of dues and 4 through subscriptions to the Headquarters Building Fund

The total membership is approximately 4000 and the suspensions will probably be lower as financial conditions improve A number have found it difficult to keep up even the nominal dues, and we need coöperation in bringing in new members as rapidly as possible

Local Branches —These organizations have kept up their programs very satisfactorily with one or two exceptions, and are to be commended for their fine efforts under present conditions

The following branches were active during the year Baltimore Cincinnati, Chicago De troit, New York, Northern Ohio at Cleveland North Pacific at Portland, Northern New Jersey at Newark, Northwestern at Minneapolis, Philadelphia Pittsburgh

Student Branches —Student Branches at the Pittsburgh College of Pharmacy, State College of Washington and at the Universities of Florida, Wisconsin, California and Western Reserve were active during the year A Student Branch at the St John's University College of Pharmacy was organized recently and others are being organized

These student organizations are doing splendid work and they should be established in other schools and colleges

Representatives of several student branches are in attendance

Receipts of the Secretary's Office —Attached are detailed financial statements of the receipts from January 1 to April 30, 1934, from Dues, Bulletins, Proceedings YEAR BOOKS, Badges and Bars, Buttons and Pins and Miscellaneous Items Remittances to the Treasurer and the balance on hand are also set out

The attached reports also give detailed information in reference to the printing, binding and sale of the National Formulary and the Pharmaceutical Recipe Book

The Secretary's annual financial report for the calendar year 1933 was submitted with that of the Treasurer and audited as provided for in the By Laws

SUMMARY OF RECEIPTS AND REMITTANCES SECRETARY'S OFFICE, JANUARY 1 TO APRIL 30, 1934

Receipts by Secretary

Balance on deposit January 1 1934		$2 048 26
Dues		
Membership only	$ 88 00	
Membership and JOURNAL, 1932	100 00	
Membership and JOURNAL, 1933	332 00	
Membership and JOURNAL, 1934	4494 50	
Membership and JOURNAL 1935	30 00	
	$5044 50	
JOURNAL	3782 63	
National Formulary	1356 20	
Recipe Book	261 10	
YEAR BOOKS	4 00	
U S P-N F Prescription Ingredient Survey	14 00	
Leaflet No 14	0 25	$10 462 68
Total Receipts		$12,510 94

Remittances to Treasurer

Jan 31, 1934, Check No 150	$2582 35	
Feb 21, 1934, Check No 151	1578 83	
March 27 1934, Check No 152	3926 25	
April 24 1934 Check No 153	2411 15	$10,498 58
Balance on Deposit		$2,012 36

NATIONAL FORMULARY

RECEIPTS AND DISBURSEMENTS ON ACCOUNT N F, JANUARY 1 TO DECEMBER 31 1933

Receipts

Sales for quarter ending March 1 1933, N F V	$1159 20	
Sales for quarter ending June 1, 1933, N F V	214 20	
Sales for quarter ending September 1 1933 N F V	984 62	
Sales for quarter ending December 1, 1933, N F V	1557 84	
Sales for year, N F III and N F IV	5 00	
Sales for year, Bulletins N F VI	36 50	
Total Receipts		$3,957 36

Disbursements

N F V		
Henry McKeen & Son Insurance	$ 11 25	
Mack Printing Co , Printing and Binding	780 68	
Adley B Nichols Exhibits at A M A Meeting	160 25	
N F VI		
E N Gathercoal, General and Traveling Expenses	609 70	
Mrs L E Barnett Clerical Services	220 00	
Miss Marian Dawling, Clerical Services	13 68	
Miss Hattie Dymewicz, Exhibit at Madison	10 25	
Samuelson Duplicating Co , Bulletins etc	986 40	
Glenn L Jenkins, Committee Expense	6 40	
H A Langenhan, Committee Expense	18 80	
Adley B Nichols, Committee Expense	11 12	
S L Hilton, Committee Expense	2 71	
Pilcher Hamilton-Daily Co , Binders etc	313 45	
J A Darjahn, Lettering N F Binders	17 50	
Gaw O Hara Envelope Co , Envelopes	41 86	
Journal A Ph A Reprints	7 99	
Mack Printing Co	11 77	
Natl Confer Pharm Research, Membership	25 00	
E P Douglas, Printing U S P-N F Pres Ingred Survey	630 90	
Chicago Book Binding Co , Binding U S P N F Pres Ingred Survey	157 92	
Lee G Cordier Checking Tests for Tablets	108 00	
E F Cook, Expenses U S P N F Exhibit at Chicago	85 38	$4,231 01

Receipts and Disbursements on Account N F , January 1 to April 30, 1934

Receipts

Sales quarter ending March 1, 1934 N F V	$1327 20	
Use of Text	10 00	
Sales to April 30 1934 N F II and III	2 50	
Sales to April 30 1934, Bulletins N F VI	16 50	$1,356 20

Disbursements

N F VI		
E N Gathercoal, General and Traveling Expenses	$359 85	
Samuelson Duplicating Co , Bulletins etc	422 30	
Pilcher-Hamilton-Daily Co , Binders and Paper	123 75	
Glenn L Jenkins, Expenses Sub committee No 2	210 20	
E P Douglas Lettering on Binders	19 30	
Miss Edith Smith Clerical Services	81 60	
Mrs L E Barnett Clerical Services	22 40	
Adley B Nichols Postage, etc	20 33	
Humiston Keeling & Co Supplies	19 57	
Journal A Ph A , Reprints	2 66	$1,281 96

Summary of Receipts and Disbursements on Account of N F January 1, 1926 to April 30 1934

Receipts		*Disbursements*	
1926	$45 318 21	1919–1920	$1 038 89
1927	17,460 75	1921	1 169 98

1928	14 565 15		1922	404 21	
1929	12,718 40		1923	227 72	
1930	9,940 05		1924	95 59	
1931	8,271 00		1925	236 30	
1932	4 243 27		1926	20,857 09	
1933	3,957 36		1927	8,389 38	
1934 (to April 30)	1,356 20		1928	3,560 41	
			1929	3,556 60	
Total Receipts		$117 830 39	1930	6,123 32	
			1931	3,702 38	
			1932	3 957 36	
			1933 (to April 30)	1,281 96	$54 601 19

SUMMARY OF SALES OF N F V—JANUARY 1 TO DECEMBER 31 1933

Quarter Ending	Binding	Copies	Price	Amount	Rec'd by Secretary
Mar 1, 1933	Buckram	483	$2 40	$1,159 20	
	Leather	0			$1,159 20
June 1, 1933	Buckram	93	2 40	223 20	
	Leather	1	4 80	4 80	
	Less freight and postage			13 80	214 20
Sept 1, 1933	Buckram	484	2 40	1,161 60	
	Leather	0			
	Less 37 copies Leather returned and postage			176 98	984 62
Dec 1, 1933	Buckram	652	2 40	1,564 80	
	Leather	1	4 80	4 80	
	Less freight and drayage			11 76	1,557 84
	Total Sales for 1933				$3,915 86

SUMMARY OF SALES OF N F V—JANUARY 1 TO APRIL 30, 1934

Quarter Ending	Binding	Copies	Price	Amount	Rec'd by Secretary
Mar 1, 1934	Buckram	553	$2 40	$1 327 20	
	Leather	0			$1 327 20
	Total Sales for 1934 (to April 30)				$1,327 20

SUMMARY OF COPIES OF N F V—PRINTED AND BOUND TO APRIL 30 1934

Series	Buckram	Leather	Total
A	19,561	500	20 061
B	10 023		10,023
C	5,000		5,000
D	5,000		5 000
E	5,000		5 000
F	4,042		4,042
	48 626	500	49 126

SUMMARY OF COPIES OF N F V—DISTRIBUTED COMPLIMENTARY SOLD AND HELD IN STOCK BY J B LIPPINCOTT COMPANY, TO APRIL 30, 1934

	Buckram	Leather	Total
Copies used in copyrighting and for complimentary distribution through the Mack Printing Co	33	12	45
Copies distributed complimentary through the Chemical Catalog Co	32		32
Copies sold by the Chemical Catalog Co *	18,021	70	18,091
Copies distributed complimentary through J B Lippincott Co	15		15
Copies sold by J B Lippincott Co	30 194	30	30,224
Copies held in stock by J B Lippincott Co	331	388	719
	48 626	500	49 126

PHARMACEUTICAL RECIPE BOOK—SUMMARY OF RECEIPTS AND DISBURSEMENTS, RECIPE BOOK I

Receipts			*Disbursements*		
1929	$5,256 00		1917	$ 10 50	
1930	1,920 98		1918	19 26	
1931	3 641 80		1919		
1932	1,356 64		1920	1 40	
1933	894 94		1921	23 98	
1934 (to April 30)	261 10		1922	42 93	
			1923		
Total		$13 331 46	1924	470 70	
			1925	572 47	
			1926	336 38	
			1927	95 08	
			1928	766 66	
			1929	9,838 65	
			1930	51 00	
			1931	61 96	
			1932		
			1933	130 51	
			1934 (to April 30)	26 80	
			Total		$12,448 28

SUMMARY OF SALES OF PHARMACEUTICAL RECIPE BOOK I—JANUARY 1 TO DECEMBER 31, 1933

Quarter Ending	Binding	Copies	Price	Amount	Rec'd by Secretary
Mar 1, 1933	Buckram	61	$2 78	$169 58	$169 58
June 1, 1933	Buckram	39	2 78	108 42	108 42
Sept 1 1933	Buckram	125	2 78	347 50	
	Less postage			0 22	347 28
Dec 1 1933	Buckram	97	2 78	269 66	269 66
	Total				$894 94

* The Chemical Catalog Co sold 107 copies Leather of which 37 copies were returned by dealers to J B Lippincott Co during quarter ending June 1 1933

SUMMARY OF SALES OF PHARMACEUTICAL RECIPE BOOK I—JANUARY 1 TO APRIL 30, 1934

Quarter Ending	Binding	Copies	Price	Amount	Rec'd by Secretary
Mar 1, 1934	Buckram	94	$2 78	$261 32	
	Less postage			0 22	$261 10
	Total				$261 10

SUMMARY OF COPIES OF PHARMACEUTICAL RECIPE BOOK I—PRINTED AND BOUND TO APRIL 30 1934

	Buckram
Series A	5000

SUMMARY OF COPIES OF PHARMACEUTICAL RECIPE BOOK I—DISTRIBUTED COMPLIMENTARY SOLD AND HELD IN STOCK BY J B LIPPINCOTT COMPANY, TO APRIL 30, 1934

Copies distributed complimentary	94	
Copies sold	4803	
Copies held in stock	103	
Total		5000

ACCOUNT OF YEAR BOOKS PROCEEDINGS, BULLETINS

1 Sales		2 Expenses	
1933	$1136 75	1933	$3409 08
1934 (to April 30)	4 00	1934 (to April 30)	1102 39
Total	$1140 75		$4511 47

There being no further business the meeting then adjourned

SECOND SESSION

The Second Session of the House of Delegates was held in the Wardman Park Hotel, Washington D C , following the First General Session of the AMERICAN PHARMACEUTICAL ASSOCIATION

The minutes of the First Session were read and accepted (see minutes of the First Session of the House of Delegates)

The annual report of the Council to the House of Delegates was read and accepted It follows

ANNUAL REPORT OF THE COUNCIL TO THE HOUSE OF DELEGATES

This report is submitted to summarize the proceedings of the Council which are printed in full in the JOURNAL

The reorganization meeting of the Council for 1933–1934 was held in Madison Wisconsin, on Friday, September 1, 1933 S L Hilton was elected Chairman, C H LaWall Vice Chairman and E F Kelly, Secretary E G Eberle was elected Editor of the JOURNAL, A G DuMez Editor of the Year Book, C E Caspari, member of the Commission on Proprietary Medicines for a term of five years, H V Arny and C H LaWall members of the Committee on Research for a term of five years The Committee on Recipe Book was continued for one year and the Committee on Unofficial Standards was discontinued

The President was authorized to make such appointments as are unauthorized, to fill vacancies as they may occur and to make additional appointments as may be necessary or desirable

The Chairman was authorized to appoint an executive committee of the Council should the occasion arise A meeting of the Council or of an executive committee was not found necessary and the business of the Council has been transacted by mail Eight Council Letters covering

forty-two pages and submitting fifty three items and seventeen motions have been sent to the Council members Among the more important business transacted, the following items are mentioned

Arrangements were completed for the transfer of property between the U S A and the ASSOCIATION as provided for in Public Resolution No 18, in Square 62, N W, Washington D C The deeds and agreements involved are quoted in full in Council Letter No 3

E F Kelly was elected as temporary representative on the National Retail Drug Trade Council, later, however, as the National Retail Drug Code Authority

Certain of the Liberty Bonds, Fourth Issue, held by several permanent and trust funds were called for payment These were sold and the proceeds reinvested in uncalled bonds of the same issue at approximately the same price Five thousand dollars of the accumulated interest of the Life Membership Fund was transferred to the Current Fund to balance the budget

The contract for printing and mailing the JOURNAL for 1934 was awarded to the Mack Printing Co of Easton, Pa

A budget totaling $33 680 for the current expenses for 1934, was adopted The budget for 1933, totaled $39,525

The accounts of the ASSOCIATION were audited by W A Johnson & Co, Baltimore, Md, Certified Public Accountants, and their report, with a summary of the accounts, was published in the JOURNAL for March 1934, pages 264–268

May 7th to 12th was chosen as the time for the 1934 meeting, Frank A Delgado as Local Secretary and the Hotel Shoreham as Headquarters

The officers of the ASSOCIATION were transferred from 10 W Chase St, Baltimore, Md, to the Headquarters Building, 2215 Constitution Ave, Washington, D C, during the first week in January 1934

The application and Constitution and By Laws for the St Johns University, College of Pharmacy, Student Branch, New York, N Y, were approved

The ASSOCIATION, by invitation of the officers of Section N, American Association for the Advancement of Science, held a joint session with the American College of Dentists, during the annual meeting of the A A A S in Boston, December 26–29, 1933 Dr J C Krantz Jr, *Councillor*, arranged for the joint session and presided

Dr H W Youngken represented the ASSOCIATION at a meeting of the American Joint Committee on Horticultural Nomenclature in New York City, on January 15, 1934

The second and third meetings of the Council were held in Washington, D C, on Monday, May 7th, and on Thursday, May 10, 1934

Annual reports were received from the Committees on Property and Funds, on Finance, on Publications, on Student Branches, on Research, on Standard Program, on Recipe Book and on National Formulary, and from the Editors of the JOURNAL and of the YEAR BOOK The Commission on Proprietary Medicines reported progress These reports covering the property, funds and publications of the ASSOCIATION were given careful attention and they show that the affairs of the ASSOCIATION are in a sound condition

Mr J K Lilly was nominated to the House of Delegates for election as Honorary President for 1934–1935 E F Kelly as Secretary and C W Holton, as Treasurer

Mr Charles Moore, *Chairman* of the Commission of Fine Arts, was elected an Honorary Member

The Research Fund of $1000 was awarded to Dr W J Husa for the continuation of his studies of extraction and arrangements were made to publish the reports on the work so far done under similar grants

The proposal to establish a Council on Pharmaceutical Practice was submitted by Prof E Fullerton Cook and a committee was appointed to study the plan and report later to the Council

Permission to partially reproduce the text of the N F V was granted to several applicants for which the usual charge was made except in two cases

Two hundred and sixty applicants were elected to membership during the year

Respectfully submitted
S L HILTON, *Chairman*

The report of the Treasurer, deferred from the First Session, was read by Treasurer Holton and accepted

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION,
JANUARY 1 TO MARCH 31, 1934

PROPERTY AND FUNDS OF THE ASSOCIATION

	June 30 1933	March 31 1934
Current		
Savings and Checking Accounts	$ 2,145 63	$ 3 279 10
Secretary's Account, Baltimore National Bank	2,625 10	2 888 90
Total	$ 4,770 73	$ 6,168 00
Permanent		
Endowment	$ 14,921 12	$ 15 234 40
Centennial	5,648 18	5,778 44
Ebert Legacy	8,117 32	8 329 82
Ebert Prize	1,072 85	1,044 88
Life Membership	42,106 74	36,755 06
Endowed Membership	129 20	132 20
Research	64,319 86	65,038 94
Headquarters Building, Bonds and Cash	74,582 18	2,954 80
Headquarters Building, Property	422,624 19	487,682 94
Total	$633,521 64	$622 951 58
Trust		
Procter Monument	$ 16,982 82	$ 17,316 52
Remington Honor Medal	1,314 41	1,326 09
Total	$ 18,297 23	$ 18,642 61
Summary		
Assets	$638,292 37	$629,119 58
Held in Trust	18 297 23	18,642 61
Total	$656,589 60	$647,762 19

SECURITIES PROPERTY AND CASH HELD FOR THE ASSOCIATION AND FOR THE TRUST FUNDS, MARCH 31, 1934

Securities		
Liberty Bonds, 4th issue, 4¼%	$ 39,200 00	
State of Massachusetts Bonds 3%	14,000 00	
State of Tennessee Bonds, 4½%	3,000 00	
State of Illinois Bonds, 4%	6,000 00	
State of North Carolina Bonds 4½ %	7,000 00	
City of Baltimore, Md , Bonds 4%	40,000 00	
City of Chattanooga, Tenn , Bonds, 4½%	8 000 00	
City of Dallas, Texas, Bonds, 4½%	11,000 00	
City of Newark, N J , Bonds 4%	6 000 00	
City of Paterson N J , Bonds, 4¼%	1,000 00	
Chicago Milwaukee, St Paul and Pacific R R Co , Bonds, 5%	200 00	
Town of Montclair, N J , Bonds, 4¼%	4,000 00	
City of Detroit, Mich , Bonds 4%	1,000 00	$140,400 00

Property		
Lots 3, 4, 5 7, 12, 13 14 15 16, 17, 801 and 802 Square 62, Washington, D C	$523 882 94	
Less Mortgage on Lot No 7	36 400 00	$487,482 94
Cash		
Boston Penny Savings Bank, Boston Mass , Savings Account	$ 408 08	
Merchants & Newark Trust Co , Newark N J , Checking Account	2,883 48	
Baltimore Trust Co , Baltimore, Md , Checking Account	4,678 61	
Baltimore National Bank, Baltimore Md , Checking Account	8,954 23	
Maryland Trust Co , Baltimore, Md , Savings Account	2,954 85	$ 19,879 25
Total		$647,762 19

Of the securities owned by the ASSOCIATION only one $1000 bond of the City of Detroit (in the Life Membership Fund) has failed to pay interest to the amount of forty dollars

The property entry represents the actual payments on the site in Washington, D C , for the Headquarters Building including recording insurance of title and other incidental charges and advance payments on architects' and engineers' fees etc The entry does not include the cost of furniture, equipment, approach, grading or planting Record should be made of the fact that the original deposit on the site, amounting to $5000 was paid by Dr H A B Dunning personally and credited to his subscription and therefore this amount does not appear in the bank deposits of the Headquarters Building Fund although it is included in the total of collections for the fund

The net total of subscriptions to the Headquarters Building Fund on March 31, 1934 was approximately the same as on June 30 1933 $817,156 43, and the total of collections, including the $5000 deposit toward the purchase of the site made by Dr H A B Dunning which was credited to his subscription was $506,024 30 The Chairman of the Campaign Committee will give further details in his annual report

The campaign has cost in total $63 087 76 of which amount $13,023 94 was spent in 1924 $11,944 05 in 1925, $10,007 06 in 1926, $9297 31 in 1927, $10,627 34 in 1928, $3333 61 in 1929, $1031 25 in 1930 $1495 98 in 1931 $1512 90 in 1932 and $814 32 in 1933 The cost of the campaign has been paid from the interest on the fund and all collections have been used for the purchase of the site to pay taxes and insurance architects', engineers' and builders' fees, etc , or are in hand as shown in the yearly reports

The Secretary's report will show receipts from Dues, the JOURNAL, the National Formulary, Recipe Book, YEAR BOOKS, Proceedings Bulletins, Badges and Bars, Buttons and Pins and Miscellaneous Items, which are collected by him and deposited in the Secretary's account in the Baltimore National Bank These receipts are transferred by check accompanied by itemized deposit slips, to the ASSOCIATION'S checking account in the Merchants and Newark Trust Company from which all budget expenses are paid by voucher check

The annual report of the Treasurer for the calendar year 1933 was audited and approved by W Albert Johnson, the auditor approved by the Council A summary of this report, together with the report of the auditor appears in the JOURNAL for March 1934 pages 264–268, and both reports will be published in full in the next YEAR BOOK

CHARLES W HOLTON *Treasurer*

The reports of the Council and of the Committees on Pharmacy Corps in the U S Army and on Legislation were by request deferred to the Third Session

E F Kelly reported progress for the Committee on the Study of Pharmacy—it was accepted The Report of Prescription Tolerances was discussed by R L Swain and S. L Hilton and will be further reported at the next session of the House of Delegates and as part of the program of the Section on Practical Pharmacy and Dispensing

A communication from the Council was read nominating to the House Mr J K. Lilly of Indianapolis Ind as *Honorary President* E F Kelly as *Secretary* and C W Holton as *Treasurer*

of the ASSOCIATION for 1934–1935 On motion, President Swain was authorized to cast the unanimous ballot of the House for the election of those nominated which was done and they were declared elected

Chairman W B Day presented the report for the Committee on Nominations

REPORT OF THE COMMITTEE ON NOMINATIONS

The Committee on Nominations of the House of Delegates respectfully submits the following nominations

For Chairman of the House of Delegates Rowland Jones, South Dakota

For Vice Chairman of the House of Delegates S A Williams Alabama

For *President of the* AMERICAN PHARMACEUTICAL ASSOCIATION P H Costello, North Dakota, A Ziefle, Oregon F E Mortensen, California

For *First Vice President* Frank A Delgado, District of Columbia, C L O'Connell, Pennsylvania, Roy M Riley, Kansas

For *Second Vice President* John P Jelinek, Minnesota, J Lester Hayman West Virginia, Herbert W Parker, Arkansas

For *Members of the Council* James H Beal, Florida, C H LaWall, Pennsylvania, C E Caspari Missouri, R L Swain, Maryland, Theodore J Bradley, Massachusetts, John C Krantz Jr , Maryland, J G Beard North Carolina, Frank Milne, Kansas, Walter F Meads Iowa

On motion, Rowland Jones of South Dakota and S A Williams of Alabama were elected as *Chairman* and *Vice Chairman*, respectively, of the House for 1934–1935 The nominees for President, First Vice-President, Second Vice-President and Members of the Council were approved for submission to the members by mail ballot as provided in the By-Laws

Chairman Bradley submitted reports for the Committee on Transportation and on Place of Meeting

REPORT OF THE COMMITTEE ON TRANSPORTATION

The Committee on Transportation submits the following brief report This committee has considerable work of an executive character to do during the year, and we were pleased to receive all available concessions from the railroads for this meeting, including round trip tickets for one and one-third fares, a wide spread of time for the sale of these tickets, a thirty day time limit for the return to the starting point and going and returning by different routes if that be desired The round trip ticket was used before beginning the going journey and only needs to be validated by the stamp of the ticket agent in the Washington or Baltimore station at the time of beginning the return journey No additional concessions are allowed to anyone, to our knowledge These arrangements are in effect in all sections of the United States and Canada except the Southeast, where special limited excursion tickets are on sale at equally low or lower rates

T J BRADLEY, *Chairman*

REPORT OF COMMITTEE ON PLACE OF MEETING

Chairman Theodore J Bradley stated that practically the same committee had served for the past 18 years and is governed by a purpose to serve the ASSOCIATION Efforts are made to select meeting places so that in turn all sections of the country are visited He then referred to the rotation of prior meeting places If it had not been for the World's Fair in Chicago the Northwest would have been presented last year and the Dedication again interfered this year The pharmacists of Montana, Washington and Oregon are becoming conscious of the AMERICAN PHARMACEUTICAL ASSOCIATION and have worked up an enthusiastic attitude The members of the committee present in Washington are unanimously agreed that the 1935 meeting of the ASSOCIATION be held in Portland the time to be determined by the Council and the Local Committee

A O Mickelson, of Portland, spoke of the attractions of this section of the country and the opportunities for creating a greater interest in the AMERICAN PHARMACEUTICAL ASSOCIATION

Seconding the report of the Committee on Place, S L Hilton moved the selection of Portland for the 1935 meeting

Both reports (Transportation and Place) were adopted, the time of meeting to be named by the Council

A O Mickelsen expressed appreciation because of the selection and assured the efforts of the pharmacists of the Northwest

The meeting then adjourned

Third Session

The Third Session of the House of Delegates was held in the Shoreham Hotel, Friday forenoon, May 11th, Chairman Costello presiding The minutes of the Second Session were approved as read (See Second Session of the House of Delegates)

Chairman James E Hancock of the Committee on Procter Memorial presented a verbal report explaining the development and present status of the proposal to place a suitable statue of William Procter, Jr, in the Headquarters Building He also submitted a resolution which was referred to the Committee on Resolutions The report was received (See Resolution No 15, page 476)

Chairman Hancock spoke in part as follows

'At the semi centennial meeting of the Association in Philadelphia the characters of some of the early masters of Pharmacy were outlined, and it was there developed that William Procter, Jr, more than any other man, had forecast the destiny of this Association He had practically defined what was to be the set up of the Association and its scientific character

In the several years that followed men like Ebert Remington, my father and others developed and delivered papers on Professor Procter, and in view of the fact that 1917 was the Centennial year of Procter s birth, the idea germanated that he should be given some tribute for his work for this Association and for American Pharmacy

'A committee was appointed to formulate such plans, and on the committee's report that the proper thing to do was to erect a statue to Procter in the City of Washington, the committee was continued to collect money to approve a site and to approve a model for such a monument By 1914 all the money for this monument had been collected The marble had been selected and the site had been approved, after consultation with the trustees of the Smithsonian Institution They because of Procter s scientific work were very glad to have a monument on these grounds

'The World War in 1914 interfered and when we got into the War, in 1917 it was absolutely impossible to bring Congress to the consideration of a site for the Procter Memorial, because of the confusion at that time So the Centennial Year passed although we were ready to erect the monument

'In 1921 we began to consider the American Institute of Pharmacy, and, in 1923, when it took shape this committee proposed to the Association that the Procter Monument should be erected in conjunction with the building That demanded, of course, a recasting of the figure to adapt it to the foyer which had been selected by the Building Committee, instead of having an outside figure There is on exhibit in the building a figure of Procter that has met the approval of our committee, with but two minor criticisms One is from Dr Wellcome who thinks that the head and the face probably could be a little softer and Dr A R L Dohme thinks that there should be a stoop in the figure I have a letter from a sister of William Procter in which she pridefully speaks of the very erect carriage of her brother

'We have concluded to report to you the approval of the proposed statue by the committee, subject to the endorsement and the help of the architect of the building

"I would like to get some information As I understand it this committee was appointed with power to act and I would like to make this résumé We not only have the money for the monument, but when it is finished there will be a substantial balance that will be turned into the treasury for other purposes The model has been approved by the committee and the site has been selected We had hoped that Mr Pope the architect would be at this meeting but unfortunately he is in Europe and the matter of the base of the monument is to be carefully considered

'We ask the opinion of this body when those details have been worked out if it is within our power to proceed with the casting of the monument and its erection in the place that has been selected for it, so that it can be unveiled at some proper time at a meeting either of the House of Delegates of the whole body or at some other time in the City of Washington I don't

think there is anything else that I can say but I have been desirous to let you know, because of the long continuance of this committee, the conditions that we have been up against"

Charles J Clayton moved that the report be received and take the usual course

The motion was duly seconded and carried

The reports of the committees on Physiological Testing on Pharmaceutical Syllabus on Legislation on Weights and Measures, on Local Branches were presented and received for publication (The reports follow in the order of the stenographic transcript)

The report of the Committee on Physiological Testing will be printed under Committee Reports in a succeeding issue of the JOURNAL

The report of the Committee on Pharmaceutical Syllabus was read by H M Burlage

REPORT OF THE COMMITTEE ON PHARMACEUTICAL SYLLABUS

During the nine months that have intervened between the last and the present report of the Chairman very little of interest has developed in regard to the Syllabus

The volume has been declared official by the AMERICAN PHARMACEUTICAL ASSOCIATION the American Association of Colleges of Pharmacy, and, with a slight qualification, by the National Association of the Boards of Pharmacy The last-named organization has perhaps given the new Syllabus more thoughtful and favorable consideration than has either of the other bodies mentioned

Certain concrete suggestions or criticisms of a constructive nature have been offered to and gladly accepted by the Chairman but since these can only be employed when the Syllabus is revised they need not be discussed at this time

There is however, one matter that perhaps merits your attention since it may explain why the last or even the next revision will not satisfy every one having occasion to use it as a guide It must be clear to any student of the subject matter employed in pharmaceutical education that there is doubtless less unanimity of opinion about it than is true of any other type of organized education There is no real semblance of unity or agreement about nomenclature content sequence or distribution of courses shown in our several school catalogs It is only a slight exaggeration to say that in the fifty seven member colleges of the national association there are fifty seven definitely different curricula offered Can this be said of any other type of professional or even undergraduate instruction?

We have had no standard to guide us save the very elastic and general one required for membership in the A A C P The present Syllabus represents an effort to supply such a standard, a standard that is specific and not general

It is easily understood why the nomenclature together with the outlines and lengths of courses laid down have not met with general approval in spite of the fact that fifty representative people were engaged in the task of setting up a sort of compromise syllabus that was designed as nearly as possible to suit the needs of Board and College members The fact that we attempted a liberal curricular standardization did not mean that we expected our product to be perfect That it has been criticized sometimes severely, is not surprising Each succeeding revision is going to meet opposition just as each new Pharmacopœia fails to satisfy every one Humorously enough it is often true that the loudest criticism comes from those who were asked to criticize beforehand but who wait until it is too late to be of much value to turn loose the floodgate of their objections Instead of such an attitude it would be better if every person who will be involved with the next Syllabus were to offer every helpful criticism possible and at the same time be willing to make minor concessions to major policies

In the Chairman s fiscal report for August of last year a cash balance of $143 18 was indicated Up to May 1 1934, the receipts have been $87 25 (representing the sale of 41 copies of the Syllabus) and the disbursements have amounted to $23 This leaves a current balance of $207 43

J G BEARD, *Chairman*

The report of the Committee on Pharmaceutical Syllabus was accepted with thanks to Chairman Beard

The report of the Committee on Physiological Testing was read by Chairman James C Munch and accepted —To be printed under ' Committee Reports " in a succeeding issue of the JOURNAL

The report of the Committee on Legislation was read by R L Swain, who advised that he was not a member of the committee, on behalf of Chairman Burdine, he stated the Chairman was of the opinion that the Chairman of the Committee should not be from Washington The report was accepted it follows

REPORT OF THE COMMITTEE ON LEGISLATION

The ten months, since the Madison meeting of this ASSOCIATION, has been fraught with anxiety, indecision, despondency and disgust on the part of the pharmacists, both professional and commercial They are anxiously concerning what the final set-up of the food and drug laws will be They cannot decide as to the method of conducting their businesses due to the multiplicity of proposed federal and state laws Their despondency is the result of the failure of the NRA to give them the expected and long sought relief from 'cut throat" competition, even though the manufacturers dozen lot list price was granted as minimum resale price Finally, they are extremely disgusted with the whole economic set up which allows certain practices to be legal in one industry and vicious when applied to the drug field

You are thoroughly acquainted with what has transpired in these ten months You are and have been suffering with the Coditis epidemic, ' and are therefore, as well or better informed than we of this committee on the legal phases of the happenings of these few months Our esteemed Secretary E F Kelly and President R L Swain, W Bruce Philip and R E Lee Williamson, a member of this committee, have kept close to the courses of these happenings and have done wonderful work in the interests of the pharmacists Dr James H Beal's work on the proposed Pure Food and Drug Legislation was a masterful effort in your behalf and he is the one who can be commended for informing the authorities and keeping the bills in *status quo* Therefore, we, the Committee, feel that your officers have kept you fully informed concerning the legislative activities and that there is nothing we can add

But we do wish to cite some conditions that have a trend of vitally (?) concerning every pharmacist and in a way that present conditions will seem minor and unimportant Let us take your Code difficulties as an illustration Local code authorities in the drug field are having great difficulty in collecting the assessments as specified by law, because the individual who had high hopes of benefits and improvements has not received them and feels that he has been additionally burdened to the point of economic exhaustion Again, the rank and file are dissatisfied with the codes because they do not provide the necessary rules that make it possible to take care of wages and hours out of profits instead of capital

What will be the result of all this dissatisfaction on the part of the pharmacists on the one hand and the NRA on the other? Just this—You will find that you will be if you are not now, a private in the regiment of business endeavor that the Government will enforce the military system of rule strictly officered by those not of your own choosing You will be forced to comply in every way to any and all orders and regulations Along with this may come, if the difficulties persist the operation of each and every business whether big or small, by license meaning that to be able to continue in business you will be required to secure a license from the Government That license will not be given until your business has been inspected your books examined and a figure set on the amount of profits you can make Should your business, by ability personality advertising or other promotion exceed the set amount allowed then all profits over this amount will revert to the Government

If you don t believe so, then we recommend that you study Tugwell s new book, "Our Economic Society ' and especially the last few chapters wherein is stated that the policy for the future will be the limiting of profits Mr Tugwell contends that business should not be operated for profits but for service only It is contemplated by the author or the publishers (probably the latter) to have this book used as a textbook in all the high schools of this country, if it is possible to do so

This seems a dreary prospect and let us hope it never comes true Sit down around a table with other men and do some thinking and planning ahead We should spend a good many days and consult a good many people We should try to forecast the picture of what the situation may be six months a year or more, hence Then we should go home and do something about it and do it right away

You are going to see some unanticipated developments from what has transpired in Washington Better keep an ear to the ground

A V BURDINE, *Chairman*

The report of the Committee of the Establishment of a Pharmaceutical Corps in the United States Army was presented by R L Swain He made an explanatory statement preceding the presentation of the report He said it was understood by Chairman Leigh of the American Association of Colleges of Pharmacy and the Chairman of the Committee of the AMERICAN PHARMACEUTICAL ASSOCIATION (R L Swain) that this would be a joint report, although it would be submitted separately to the respective organizations He explained that the agreement came about after some correspondence between Chairman Leigh and Chairman Swain and other members of the committee It was arranged that Dr Leigh should come to Washington and he and Secretary Kelly and the reporter were in conference with Surgeon General Patterson discussing the present existing conditions in the United States Army, expressing firmly our objective and having him state as clearly and as frankly as he could the Government's reaction to the whole matter

This report contains a verbatim statement of a letter received from Surgeon General Patterson by the committee in which he reaffirms his brief previous statement that he is in complete accord with the efforts of the ASSOCIATION to improve pharmacy and pharmaceutical service and that he stands committed to cooperate in the furtherance of that objective just as soon as the economic situation improves to warrant his asking the Secretary of War to approve a general project which he has in mind for the re organization of the Medical Department of the Army

He again expressed his disagreement to any effort on our part to establish a separate and distinct pharmaceutical corps, his reason being that it is in conflict with their larger plans for pharmaceutical service in the army, and that there are present enforcement difficulties, administrative difficulties, which make it highly undesirable from the military point of view He wants it understood, however, that that has not the slightest reference to his desire that the pharmaceutical service meet our requirements, nor is it to be construed, so he says, as indicating any lack of interest in our program

The reporter thinks it can be said truthfully and without the slightest effort at exaggeration, that Surgeon General Patterson's views are in keeping with the later views of his predecessor, to the effect that the pharmaceutical service should be improved in the army, and that it should be done just as promptly as conditions warrant

Chairman Swain then presented three recommendations, concurred in by the joint committee which are embodied in resolution No 17, page 476 The report follows

REPORT OF THE COMMITTEE ON THE ESTABLISHMENT OF A PHARMACEUTICAL CORPS IN THE UNITED STATES ARMY

(Thirty fifth Annual Meeting of the American Association of the Colleges of Pharmacy)

At the 1933 meeting of the ASSOCIATION, the Committee on the Establishment of a Pharmaceutical Corps in the United States Army was instructed to continue its effort to secure the proper recognition of pharmacy in the United States Army The ASSOCIATION indeed, went on record for the recognition of pharmacy on a parity with the Dental, the Veterinary and the Medical Administrative Corps within the Medical Department of the United States Army

The Committee has, during the past year endeavored to carry out the wishes of the ASSOCIATION both by correspondence and interviews A number of the leading pharmaceutical organizations including some of the state pharmaceutical associations have continued, or appointed special committees on the establishment of pharmacy properly in the United States Army Interest and effort have increased since our last report, and while we have not accomplished our objective, we have made some progress

Your Chairman upon the approval of the Chairman of the Executive Committee met, by appointment with the President and the Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION in the office of the Surgeon General on April 9th, of this year The Executive Officer, Lieutenant Colonel Robert C McDonald, Medical Corps received us courteously and we conferred with him for some time After the interview which was very satisfactory from an infor

mational standpoint, we requested him to transmit to us in writing the chief features of the conference as contributed by him in order that we might convey to the ASSOCIATION a report free from any misinterpretation He kindly and promptly complied We now quote at length from his letter

'The Surgeon General realizes the high standard of training being offered by the colleges of pharmacy of the leading universities of the country, as explained by Dr Leigh While the general management of Army pharmacies is and has always been satisfactory because a sufficient number of qualified pharmacists have been secured through the enlistment of qualified men or the training in the service of enlisted men in pharmacy the Surgeon General will overlook no opportunity to improve the pharmaceutical service in any manner possible Furthermore the Surgeon General will take the first favorable opportunity to improve the pharmaceutical service through securing legislation authorizing the commissioning of an adequate number of recent graduates of the best colleges of pharmacy The Surgeon General does not however, believe that the present is an opportune time for securing such legislation

In 1932 the Surgeon General recommended to the War Department that legislation be secured authorizing certain increases in Medical Department personnel including a reorganization and increase in the Medical Administrative Corps In the reorganization of the Medical Administrative Corps he proposed that the name be changed to Medical Auxiliary Corps and that approximately one-third of this new corps consist of registered graduate pharmacists The Surgeon General still believes that a maximum of forty commissioned pharmacists is adequate for the Army Medical Department The Surgeon General is not in favor of a separate Pharmacy Corps in the Medical Department of the Army The proposed Medical Auxiliary Corps would not only provide the necessary pharmacists but also a limited number of specialists other than medical needed by the Army Medical Service

' The Surgeon General does not favor any plan proposing to provide commissioned pharmacists for the Army except in connection with a bill for increasing the personnel of the Medical Department generally including a reorganization of the Medical Administrative Corps so as to include pharmacists Piecemeal legislation, in other words is not desired

' The Surgeon General hopes that before the termination of his present detail next year that a favorable time will come for him to resubmit to the War Department his plan for reorganizing and increasing the personnel of the Medical Department "

We made it evident to the Executive Officer that we would not be satisfied with any provision tending to restrict the usefulness and rank of the commissioned pharmacist We were informed that the proposed policy does not place a limitation upon his advancement This assertion is in accord with the opinion previously expressed by an officer of the Medical Corps

Some of you will recall the statement of Lieutenant Colonel Arnold D Tuttle Medical Corps, United States Army, given before the House of Delegates at the Miami meeting in which he described the scheme for promotion and grade of pharmacists commissioned in the proposed Medical Auxiliary Corps as follows

"A practical example of how this promotion scheme will work out can be illustrated by taking the case of the young physician and the young pharmacist aspiring to a commission in the Army The pharmacist enters as a Second Lieutenant at the age of twenty four, after four years service or at the age of twenty-eight he is commissioned a First Lieutenant At this time at the age of twenty eight the young physician is first commissioned and he is given an original appointment in the grade of First Lieutenant in recognition of this age differential (However the M A C officer has already been in the Army four years drawing pay and allowances, while the young physician at his own expense has been in civil life preparing himself for a commission) These two officers are both appointed First Lieutenants at the age of twenty-eight after three years more service or a total of seven years the M A C officer is promoted to the grade of Captain The First Lieutenant of the Medical Corps is promoted to the grade of Captain after three years' service Both therefore, reach their Captaincy at the age of thirty one The Captain of the Medical Corps is promoted to Major after twelve years of service and the Captain of the M A C after sixteen years' service both reaching the grade of Major at the age of forty The same principle applies on up to promotion to the grade of Colonel Both officers reach the grade of Colonel together at the average age of fifty four years

'Under this scheme of promotion you will observe that the young pharmacist will have

the same opportunity to rise in the service as the young doctor, dentist, veterinarian or other professional man aspiring to an Army career "

This scheme seems just and fair to your Committee, so far as opportunity for the promotion of the commissioned pharmacist is concerned, but it does not contemplate a special pharmaceutical corps

In the opinion of some of the army officers a plea for a separate pharmaceutical corps would bring about the restriction of the pharmacists' usefulness and rank In support of this belief they cite Bill H R 5531 introduced in the Sixty-fifth Congress first session, which provides That the Army Pharmaceutical Corps shall consist of one pharmacy director with the rank of Major ——, five deputy pharmacist directors with the rank of Captain and such number of pharmacists, with the rank of Lieutenant, and of pharmacist apprentices as may be needed for the service "

They also refer to H R 16278, Seventieth Congress, second session, a bill to amend the National Defense Act by providing for a Pharmacy Corps in the Medical Department U S Army, which provides That pharmacists shall have the rank, pay and allowances of first lieutenant and chief pharmacists shall have the rank pay and allowances of Captain, except that chief pharmacists who have served for a period of sixteen years as an officer in the Pharmacy Corps of the Regular Army shall have the rank, pay and allowances of Major " This is the highest grade mentioned in the bill

Your Committee has received serious objections from several prominent pharmacists to the scheme of the Surgeon General whereby pharmacists would be commissioned in the proposed Medical Auxiliary Corps because in their opinion pharmacy would always be subordinated where there was any conflict of interest and that we would never have the authority or the freedom necessary to develop the highest type of pharmaceutical service They feel, too, that our identity would be lost and medicine would reap the credit that justly belonged to pharmacy

The report of the Committee on Pharmacy Corps in the U S Army was received and the recommendations referred to the Committee on Resolutions

The report of the Committee on United States Pharmacopœia was received and the recommendations referred to the Committee of Revision of the U S P The report will be printed in a succeeding issue of the JOURNAL

REPORT OF THE COMMITTEE ON LOCAL BRANCHES

The Local Branches were characterized by a year of unusual activity as is evidenced by their published proceeding in the JOURNAL In the main they had in spite of present unfavorable business conditions a highly successful year

The branches in the larger areas are experiencing considerable difficulty in providing sufficient funds to carry on their work of circularizing their members Some of them have had a local branch dues of $1 per year and of course are suffering during the present trying times

An examination of the vigor of Local Branches clearly shows that the influence of the branch is in direct proportion to the success it has had in giving to its area something not provided by any other group As one of the members of the committee states it, 'The Local Branches must have an object other than to be just another organization " Briefly a local branch to be really successful must fill a real need in the community in which it is operating

The committee desires to record its satisfaction at the activity of and the growth in number of the student branches

C LEONARD O CONNELL, *Chairman*

Chairman O'Connell was thanked for his efforts and the report accepted

The report of the Committee on Weights and Measures was presented by Robert P Fischelis and discussed by Robert L Swain, S L Hilton E F Kelly, L M Kantner, Roy C Reese and the Chairman (To be published)

The report of the Committee on Membership was made by Secretary E F Kelly and discussed at considerable length by Robert L Swain Ralph W Clark, A L I Winne W J Husa Frank B Kirby, and others (Abstracts will be published in a succeeding issue of the JOURNAL)

The reports of the Committee on United States Pharmacopœia and on Horticultural

Nomenclature will be printed under Committee Reports in a later issue of the JOURNAL

The report of the Committee on Press Relations was read it follows

REPORT OF THE PRESS RELATIONS COMMITTEE

The Press Relations Committee was appointed by President R L Swain early this year and its work thus far has been largely devoted to studying the task which confronts the ASSOCIATION in seeking good, healthy, constructive publicity for pharmacy

If one will look back through annual volumes of the ASSOCIATION JOURNAL he will find recorded the reports of many publicity committees and their trials and tribulations It has been with considerable caution, therefore, that this new committee has approached its task

When the Drug Trade Bureau of Public Information ceased to function due to the withdrawal of financial support by the organizations it represented it was a keen disappointment to this ASSOCIATION Because our president is a firm believer in the value of publicity to the ASSOCIATION however this new committee has come into existence The duties of the committee fall into two general classes—regular publicity during the year and special convention publicity

The committee has approached its first duty with extreme caution and thus far its work has largely been in contacting various newspapers, news syndicates and news magazines in an attempt to sound them out and determine just what sort of material would be most likely to find its way into the news columns We have been tremendously encouraged and stimulated with what we have learned and feel that given the proper tools we may be able to do a constructive job Only one release has been distributed since the committee was organized—the announcement of the recipient of the Remington Medal

The committee's second task that of convention publicity, has been more aggressively tackled The clippings presented with this report show graphically the results of the committee's work during the past week Washington at this particular time is perhaps the hardest city in which to get publicity for between Congress in session and the NRA newspaper space is at a premium The committee however, has been encouraged by the reception its releases have had at the same hands of the Capital press

The work of the committee at this convention has consisted of attending meetings and taking notes on what transpires, preparing news releases sending the releases to the various newspapers and syndicates and guiding reporters and news photographers that they may meet those of our members whom they wish to interview

We have distributed approximately twenty news releases—six copies of each The twenty releases approximately represent sixty typewritten pages It was necessary for the committee to have a stenographer to take the releases by dictation and make the required number of copies of each release It was necessary to have each release delivered to the newspaper by Western Union messenger service in order to make headlines

We use releases for two reasons *First* the material is given to the newpaper in comprehensive convenient form and as a result we get more space than we would if we depended solely upon what a reporter would pick up at our meeting and *second* by using releases we are able to interpret the convention reports—to select those subjects which are most constructive and worth while for pharmacy rather than the most sensational and we feel that by actually writing the report the committee is able to regulate the impression received by the public when it reads of our work

This has all required considerable money The publicity in connection with this convention cost approximately fifty dollars to prepare and distribute This amount I have been willing to contribute, for this year's work was an experiment It is necessary however, for the ASSOCIATION to decide whether publicity at future conventions is worth this cost The committee feels that it is, and recommends that the sum of fifty dollars be appropriated annually for this purpose

Still more expensive will be the cost of news releases and publicity material during the year We feel that by starting in a small way and gradually increasing its activities the publicity program can be made one of great value to pharmacy

With the coöperation of our Scientific Section and individuals engaged in pharmaceutical research we feel that we can give the public a new picture of the pharmacist and what his services mean to them

The committee recommends that the ASSOCIATION give deliberation to the question of publicity and if it decides to continue such a program we recommend the establishment of a regular budget for general publicity during the year

The money invested in a publicity program will not pay dividends for some time and the ASSOCIATION must realize that the results of the work may not be recognized for several years

The committee thanks those who have helped make its task at this year's convention easier and more effective, and takes this opportunity to express its appreciation to President Swain for the opportunity he has given it to serve the ASSOCIATION and pharmacy

(Signed) JOHN C KRANTZ, JR, H C CHRISTENSEN,
E F KELLY, WALTER D ADAMS
R L SWAIN, C LEONARD O'CONNELL
ROBERT W RODMAN, *Chairman*

The report was accepted with a vote of thanks and referred to the Council

The report of the Committee on Resolutions was deferred to the Final Session of the House of Delegates and the Third Session then adjourned

FINAL SESSION

The Fourth Session of the House of Delegates was held in Shoreham Hotel, Washington D C at 7 30 P M, May 11th, Chairman P H Costello presiding

The minutes of the Third Session of the House of Delegates were read and approved (see Third Session of House of Delegates)

The report of the National Pharmacy Week Executive Committee was read by Chairman Anton Hogstad, Jr, it follows

REPORT OF THE NATIONAL PHARMACY WEEK EXECUTIVE COMMITTEE

The tenth annual observance of the National Pharmacy Week movement will be celebrated October 8–13 1934 Let us all endeavor to make the forthcoming birthday party of this splendid movement one of the best possible

During the course of the past three years, an attempt has been made better to define the aims and purposes of Pharmacy Week In this connection the advice and counsel of many leaders in American pharmacy has been sought All heartily agree that the movement is a splendid one and that it has a function to perform, but on the other hand it is seemingly quite difficult to define properly the issue It is quite apparent that any effort of a propaganda nature must have a firm foundation upon which to rest

The advice and counsel of the leaders in American pharmacy have emphasized the point that the work of this committee should be directed toward making the movement one of a constructive force in American pharmacy and not simply mere propaganda

A review of the situation clearly indicates that the best agency at hand in this connection is that of our colleges of pharmacy During the past decade or so pharmaceutical education in this country has made great progress, not only in its requirements but likewise in modern and well equipped institutions of learning To day many of our colleges of pharmacy maintain medicinal plant gardens, museums and other features that can be made to serve the Pharmacy Week movement The National Pharmacy Week Executive Committee feels that the colleges of pharmacy are in a position and should take an active interest in promoting the activities of this splendid movement, for they are well equipped to render helpful service in this connection

The Committee recommends that in order for the colleges of pharmacy to participate to the fullest possible extent that the date be changed from the month of October to the last week in April or the first week in May for the year 1935 Under the present arrangement that of celebrating Pharmacy Week during the month of October, the colleges of pharmacy are just getting under way for another scholastic year By adoption of a change of date there will be ample time for the deans and their associates as well as our splendid organization to enter into the spirit of the occasion in a whole hearted and practical manner Further, this change of date would also allow for the featuring of living medicinal plants from the plant gardens such as is not possible in certain sections of the country when observed during the month of October

The following suggestions are offered at this time in regard to a fuller participation by our Colleges of Pharmacy

1 The inauguration of an "Open House Night" at the College to which members of the laity and allied professions would be extended cordial invitations to attend A number of the colleges of pharmacy have sponsored an Open House Night in the past with gratifying results On such occasions the students should demonstrate the activities of the various departments In addition there should be many interesting displays on exhibit to express in a visual manner the professional aspects of pharmacy

2 That our colleges of pharmacy secure a prominent exhibit space in the heart of the city for the featuring of a comprehensive professional display at which time the various features of same would be explained to those inspecting same

3 That the deans, their associates and members of the student body appear before as many civic organizations as possible for the presentation of talks dealing with the romance and spirit of achievement of pharmacy There are many human interest appeal stories to be found in the archives of pharmacy which when presented in the proper manner will do much to build up a professional prestige in the mind of the laity That the deans, their associates and student body likewise appear before medical and dental organizations including medical and dental schools in order to acquaint members of the allied professions with the manner in which pharmacy can best serve the allied professions

4 That our colleges render all assistance possible to retail pharmacists in the matter of professional displays as well as supply data for talks before various civic groups

During the course of the next month a letter will go out to each dean asking that the institution in question cooperate to the fullest possible extent The Committee believes that this procedure will mark an important step in making the Pharmacy Week Movement one of a constructive force in American pharmacy and it is hoped that every college of pharmacy will assist in every way possible

ANTON HOGSTAD, JR *Chairman*

The question of date was discussed by Messrs Husa Schicks Lyman (The report was received, but no definite action seems to have been taken —EDITOR)

Report of the Scientific Section —The Scientific Section held three lengthy sessions in addition to the joint evening session with the Section on Practical Pharmacy and Dispensing The attendance was good and of the 75 titles 55 papers were actually presented and the others read by title

New officers were elected by the Section for the ensuing year as follows *Chairman*, E V Lynn, *First Vice Chairman* H M Burlage *Second Vice Chairman* R E Schoetzow, *Secretary* F E Bibbins *Delegate to the House of Delegates*, L W Rowe —L W ROWE *Secretary*

Report of the Section on Practical Pharmacy and Dispensing —Interest in the Section on Practical Pharmacy and Dispensing is manifestly on the increase Its scope of activity is constantly being enlarged and its attendance is growing This year 39 papers were presented three of which were read before the joint session with the Scientific Section A variety of subjects was dealt with Symposiums were devoted to Hospital Pharmacy Dental Pharmacy and Professional Pharmacy Single papers were given on many other subjects such as dispensing galenical and manufacturing pharmacy and teaching pharmacy

The Section adopted resolutions continuing the report of the Committee on Prescription Tolerances, and instituting an information collecting service designed to furnish pharmacists with a central source for material having to do with U S P and N F propaganda and related subjects

The officers elected for the ensuing year are *Chairman*, H M Burlage, *First Vice Chairman*, L W Rising, *Second Vice Chairman*, Frank L Black *Secretary* L W Richards, *Delegate to the House of Delegates*, R W Clark —L W RISING *Delegate to the House of Delegates*

Section on Commercial Interests —The Section held two regular sessions Eight papers were read and discussed and the attendance was good The following officers were elected for the ensuing year *Chairman*, Henry Brown *Vice Chairman* Robert Rodman *Secretary* R T Lakey, *Delegate to the House of Delegates* John A J Funk —JOHN A J FUNK *Chairman*

Section on Historical Pharmacy —Two sessions of the Section on Historical Pharmacy were

held, both were well attended and 24 papers were enthusiastically received and discussed Of special interest were two illustrated papers, one by Dr J T Lloyd on 'The History of Cactus in Medicine," the other by Professor and Mrs Charles H LaWall on 'The Squibb Collection of Pharmaceutical Antiquities"

The following recommendations were unanimously approved

1 That the Chairman s Address be referred for publication

2 That the ASSOCIATION recommend that those entrusted with the future plans of the American Institute of Pharmacy shall make arrangements for the development in the latter of a suitable historical division which by its gradual growth may become an outstanding asset to the Institute

3 That the ASSOCIATION shall again voice a plea, through its official publication for pharmacists to take a greater interest in historical pharmacy and for Schools of Pharmacy to introduce more of the subject matter of Historical Pharmacy into their curriculum

4 That a cablegram of greetings be sent by the ASSOCIATION to the Internationales Kongres fur Geschichte der Pharmazie upon the occasion of its meeting at Basle, Switzerland on May 20 1934

5 That the JOURNAL of this ASSOCIATION direct attention to the members of the A Ph A of the History of Science Society with the suggestion that the support of the work of that organization is desirable

6 That it be the policy of the ASSOCIATION to procure tone pictures on talking records of the leaders in Pharmacy and that arrangements be made through F H Freericks and J T Lloyd to procure talking records of Dr John Uri Lloyd and Dr James H Beal in Cincinnati next week.

7 That contributors of papers hereafter cite references wherever possible and that when references are given the authors endeavor to follow the method of citation of some standard text or of *Chemical Abstracts*

The following officers were unanimously elected for the ensuing year *Chairman* C O Lee, *Secretary*, H W Youngken *Delegate to the House of Delegates* Louis Gershenfeld, *Historian* E G Eberle —HEBER W YOUNGKEN *Secretary*

Section on Education and Legislation —Nine papers were presented before the Section on Education and Legislation on dentistry medicine, hospital pharmacy, legislation and pharmaceutical research There were two meetings of the Section and one joint meeting with the Conference of Pharmaceutical Law Enforcement Officials and the Conference of Pharmaceutical Association Secretaries each very well attended The interest of the audience was attested by the great amount of constructive discussion of papers

The following resolutions were presented and adopted

To the end that helpful information regarding ways and means of encouraging the prescribing of U S P and N F drugs and preparations be disseminated and made available to the pharmacists of this country, and to the end that the good work of one community or state may not be lost to other communities or states, *be it resolved*

"That a committee be appointed—to be known as the National Committee on Professional Information Its specific function shall be

'*First*—To study the methods used by the various local county and state organizations in their efforts to bring before dental men usable information on U S P and N F drugs and preparations

'*Second*—To present to the pharmacists of the nation at our next annual convention or before if the committee deems it advisable, a digest of constructive ideas gathered from such a survey

Third—The committee is to act as a center for receiving and disseminating information which will increase the pharmacist's opportunities for professional scientific service

'*Fourth*—The chairman of the committee and two other members are to be appointed by the incoming chairman of this Section Others may be added if the chairman desires, to make the committee workable"

Be it resolved that this Section on Education and Legislation appoint a committee to study the problem of coöperation with hospital pharmacists

The officers elected for the ensuing year are as follows *Chairman*, Oscar E Russell, *Vice*

Chairman C W Ballard, *Secretary*, L W Rising, *Delegate to the House of Delegates*, Geo C Schicks —W H Rivard *Delegate to the House of Delegates*

Conference of Law Enforcement Officials —The conference held several meetings also a joint meeting with the Conference of Pharmaceutical Association Secretaries and the Section on Education and Legislation

The following officers were elected for the ensuing year *Chairman* Robert L Swain, Maryland, *Secretary and Treasurer*, M N Ford Ohio, *Delegate to the House of Delegates*, Fred Schaefer, New York

The following officers were elected for the ensuing year *Chairman*, Robert L Swain, Maryland, *Secretary and Treasurer* M N Ford Ohio *Delegate to the House of Delegates* Fred Schaefer New York

The Conference of Pharmaceutical Law Enforcement Officials has mapped out a very ambitious program for the future We have slowly built up a substantial fund in our treasury which will allow us to do a lot of things that we have hoped to do in the past Among these will be a campaign for the deletion of the exceptions and exemptions contained in our pharmacy laws which nullify wholly or in part many of the pharmacy laws of the various states

Another task which we have set for ourselves is a compilation of the decisions in the various states as they affect pharmacy laws and their enforcement We hope to have this cross indexed as to states and subject matter

It was voted by the Conference in addition to the State boards to ask the State associations for donations to the work of this Conference —Rowland Jones *Reporter*

Conference of Pharmaceutical Association Secretaries —The Conference of Pharmaceutical Association Secretaries had scheduled two sessions in addition to a joint session with the Section on Education and Legislation and the Conference of Pharmaceutical Law Enforcement Officials A total of approximately thirty state association secretaries were present at the various sections

No set papers were read but a number of topics were outlined for discussion and among them Is it desirable if so is it possible to form a National association from the various associations with every member of the State association to become automatically a member of the National association without payment of additional membership dues?"

Is a State Drug Code desirable in addition to the National Code?"

' Since the State associations have been ignored in the National Drug Code what should be the attitude of the State associations to code matters?

Other similar questions were discussed each subject being introduced by some member of the organization A resolution was finally adopted, providing for the appointment of a committee to confer with the officers of the American Pharmaceutical Association relative to the formulation of a plan of membership for a greater national organization

The following officers were elected for the ensuing year *Chairman*, F B McCullough Indiana *Vice Chairman*, John Slocum, Iowa, *Second Vice Chairman* Roy C Reese Kansas, *Secretary Treasurer* Charles G Harring Massachusetts *Delegate to the House of Delegates* Charles J Clayton Colorado

On motion of R E Terry and second by W J Husa and a vote, the reports were received

Secretary Frank B Kirby reported on the **Pharmacy Exhibit at the Century of Progress,**

You may recall that in the Madison meeting we came to you with a request, hoping for $15 000 to cover the estimated budget It is our pleasure to report that we reduced the amount of the budget to $10 000 and closed the year in the red to the amount of $400 As the Association has signed the contract for the Pharmacy Exhibit for 1934 it is very pleasing to tell you that we have nearly collected the estimated budget for this year so we are not here this year to ask for any money

' Having the foundation the equipment and the flooring we hope to operate this year on a budget of less than $6000 While last year it was a rather burdensome piece of work to send out letters by the thousand, so much so that the Committee said they would not operate unless they had the money in advance and this year the first forty letters sent to contributors of last year brought in close to $5000 and we have no fear but what the balance of the money will come in

Without making any actual count of the attendance we assume that we are really within the limit of reason to estimate that the exhibit was seen by four thousand people per day We

expect an equal number this year, because improvements are under way, a number of changes which we believe will make the exhibit this year equally interesting to those who saw it last year

' I would like to close with this one request, that so far as possible you notify the chairman of the Committee, if you or any of your faculty members including the scientific staff of the manufacturing houses represented may be in Chicago during the period of the Fair by which you can have the opportunity of addressing the public on subjects of popular science

It is arranged with the Century of Progress that we shall have a lecture hall available and we already have a fair number of volunteers who are willing to fit in with this opportunity We consider it a real opportunity by which to further impress on the American public the importance of Pharmacy and what it is doing in the nature of first aid, hygiene and all of those things for which pharmacy stands

It is unfortunate that Chairman Christensen and Treasurer Riemenschneider have had to leave for home, but it is a pleasure for me to give this report "

Anton Hogstad Jr , said that in his opinion at least one million people visited the Pharmacy Exhibit at the World Fair during the year He had done considerable checking of the exhibits and the Pharmacy Exhibit was one of the best attended of all the exhibits in the Hall of Science

On motion duly seconded the report was accepted

The report of the Committee on Resolutions was read by Chairman C Leonard O Connell and he explained the points of the resolutions On motion duly seconded and a vote the resolutions were unanimously adopted (The resolutions are printed on pages 474–476 in the May issue of the JOURNAL)

Secretary E F Kelly stated that 36 states were represented in the House of Delegates

Chairman Costello announced the installation of officers Owing to the absence of S A Williams L C Lewis of Alabama, represented him as proxy

Chairman Costello installed Rowland Jones as Chairman of the House of Delegates and presented the gavel to him Chairman Jones thanked Mr Costello for his words of commendation and the members for the honor bestowed and on behalf of the pharmacists of South Dakota

L C Lewis, as proxy of S A Williams thanked the members on behalf of the pharmacists of Alabama and pledged the support of Vice Chairman Williams

On motion duly seconded the House of Delegates was adjourned

STATE PHARMACEUTICAL ASSOCIATION MEETINGS HELD DURING JUNE

Alabama—19–21, Montgomery
Arkansas—12–14 Texarkana
California—3–7 Sacramento
Colorado—12–14 Colorado Springs
Connecticut—27–28 New London
Delaware—27–28, Rehoboth Beach
Georgia—12–14 Savannah
Idaho—15–26, Lewiston
Indiana—19–21, Lake Wawasee
Kentucky—19–22 Paducah
Maine—27–29, Belgrade
Maryland—19–21, Baltimore
Massachusetts—18–20, Swampscott
Michigan—26–28, Pontiac
Mississippi—19–20 Jacksonville
New Hampshire—24–26, Portsmouth
New Jersey—13–15 Asbury Park
New York—18–22 Bolton Landing
North Carolina—25–27 Durham
North Dakota—12–14 Dickinson
Ohio—June 24–July 1, Cleveland
Oregon—July 9–11 Gearhart
Pennsylvania—19–21 Wernersville
Rhode Island—25–26 Watch Hill
South Carolina—20–21 Charleston
South Dakota—11–13, Brookings
Texas—18–21, Mineral Wells
Vermont—17–19, Fairlee
Washington—27–29 Olympia

The AMERICAN PHARMACEUTICAL ASSOCIATION is in receipt of the records requested by the Section on Historical Pharmacy of the voice of Prof J U Lloyd and James H Beal The Section on Historical Pharmacy is thankful for the prompt compliance of their request and the records undoubtedly will prove of great interest to listeners in years to come

PHARMACEUTICAL DISPLAY AT IOWA MEDICAL SOCIETY

The Iowa Pharmaceutical Association held a display of U S P and N F preparations at the meeting of the Iowa State Medical Society in Des Moines, May 9th–11th This display was sponsored by the Intraprofessional Relationship Committee, composed of Messrs George Judisch, Ames, *Chairman*, John Waizenegger Des Moines, and B P Bogan, Sioux City, to promote cooperation between physicians and pharmacists

The display was set up in the Scientific Section of the exhibits, in a space donated by the State Medical Society Many physicians stopped at the display during the three days of the meeting A gourd of Aloes without a label, aroused much curiosity and many physicains enjoyed seeing, for the first time, a drug, in the crude form which they had often prescribed This led to various discussions of the other items on display and gave the members of the committee an opportunity to explain the merits of the U S P and N F preparations In addition to the gourd of Aloes there were several species of *Aloe* plant and a species of *Artemisia* The most attractive part of the display was a digitalis plant in bloom

Pharmaceutical Display at Iowa Medical Society

One of the most valuable parts of the display was a series of eleven frequently found incompatibilities These were prepared showing the correct and incorrect method A sign placed near the incompatibilities, read 'INCOMPATIBILITY—Why a knowledge of Chemistry and Physics is so essential to the expert pharmacist The value of a medicine and even the life of the patient may depend on the skill of the pharmacist See the correct and incorrect method of compounding

---

PYORRHŒA AND MOUTH WASHES

Dealing with the treatment of pyorrhœa, Pitts (London) refers to the use of mouth washes and remarks that the most important ingredient in these is the water Their main purpose is to flush out the mouth and to remove debris Claims that this or that drug will destroy bacteria found in the mouth may be true of experiments *in vitro* but it is a fallacy to imagine that any antiseptic can be used in the mouth of such a strength that it will reduce the bacterial flora to any appreciable degree Experiments show that any reduction is temporary and quickly made up When it is remembered that in pyorrhœa there are irregular pockets round the teeth lined with infected tissue it will be obvious that the antiseptics used in a mouthwash can only play a minor part in its treatment But few patients will believe this, so if only to inspire confidence, a mouth wash containing some antiseptic is a useful measure Astringent mouth washes are recommended Hydrogen peroxide (five vols) is useful as the mechanical flushing action is increased by the effervescence of the nascent oxygen —*The Prescriber* June 1934

EDITORIAL NOTES

Because of association matter in this issue a number of items were omitted from this department

MEMBERSHIP AWARDS BY SCHOOLS AND COLLEGES OF PHARMACY

MASSACHUSETTS COLLEGE OF PHARMACY

Prizes consisting of a nomination to membership and a year's dues in the AMERICAN PHARMACEUTICAL ASSOCIATION are offered by several officers and teachers These prizes are awarded to members of the graduating class who have made good averages on the senior work in all subjects and exceptional records in separate subjects, as noted

1 *All subjects*, awarded to John A MacKenzie 2 *Pharmacy*, offered by Professor LaPierre and awarded to Isidor S Tolpin 3 *Organic Chemistry* offered by Treasurer Gammon and awarded to Phyllis Toon 4 *Materia Medica* offered by President Glover, and awarded to Sylvia Rapaport 5 *Commercial Pharmacy*, offered by Vice President Ellis, and awarded to Angelo P Papulis 6 *Analytical Chemistry*, offered by Dean Bradley, and awarded to Elizabeth H Wismer

DUQUESNE UNIVERSITY SCHOOL OF PHARMACY

Bernard J Schiller Duquesne University School of Pharmacy Pittsburgh, was awarded membership in the AMERICAN PHARMACEUTICAL ASSOCIATION for excellence in *Pharmacy* by Prof W A Jarrett, of Duquesne University School of Pharmacy Other memberships were awarded as follows by Duquesne Benjamin Elkind by Prof H W Werner for excellence in *Materia Medica*, John J Ilcisin, by Dean C Muldoon, for excellence in *Chemistry* Paul J Lucas was awarded a membership prize for the best paper presented during the year before Duquesne University Pharmaceutical Association

PHARMACEUTICAL EXHIBIT AT THE CENTURY OF PROGRESS

THE AMERICAN PHARMACEUTICAL ASSOCIATION is as last year, sponsoring the exhibit A significant indication of the enthusiastic approval given last year's enterprise is the fact that the committee this year received almost 100 per cent favorable responses from participants to the questionnaire sent to the leading contributors to the 1933 exhibit The pharmaceutical showing of last year proved to be one of the most popular of the exhibits in the medical division

SCIENTIFIC DISCOVERY

A correspondent in *Science* questions whether a more fascinating readable and informing essay on the rise and counter influences of scientific discovery by Dr Welch has ever been written It must have been a sympathetic labor of love to Doctor Welch merely to compile the data since medicine as a discipline for the pursuit of science shines out so dazzlingly For does he not record that, "I have collected without pretense to exhaustiveness, the names of over a hundred physicians or men trained for the practise of medicine or pharmacy who have made contributions to physics sufficiently notable to secure them a place in the history and records of this science "

POISONING BY METHYL CHLORIDE

Quite recently Gorham (Bristol), has again called attention to this gas 'Toxic effects" he says, are produced usually by unnoticed leaks happening in closed or ill ventilated places Often the leak may not be noticed, but at higher concentrations toxic symptoms may arise The gas when inhaled is excreted slowly, small amounts are thus apt to be cumulative and may not cause symptoms until after some days Some persons appear to be more susceptible than others" Gorham describes four cases illustrating the symptoms of a mild attack—chiefly nausea and vomiting The collected records show that the effects begin with drowsiness and apathy, leading to stupor, nausea, vomiting and abdominal pain Muscular tremors may be present, and anuria is usual in severe cases Treatment consists in first getting the patient into the fresh air, and early administration of oxygen Alkalis should be given freely It may be necessary to control convulsions, but on no account should chloral or chloroform be used for this The anæmia may have to be treated The gas is oxidized slowly, and the aim of the treatment is to hasten oxidation —*The Prescriber*, June 1934

Dr James Henry Breasted has completed a new screen picture entitled 'The Human Adventure" Press reports state that faculty members of the University of Chicago and

newspaper men sat "popeyed" when the picture was presented in the University's Oriental Institute Before them a panorama of the human race was unrolled on the screen in a preview of the film showing how the secrets of dead empires are brought to light by archæologists The film was shown to the public in Chicago on June 6th

Dr Breasted is a graduate in pharmacy, although he has not practiced pharmacy for many years

PERSONAL AND NEWS ITEMS

Dr Walter A Bastedo, president of the U S P Convention, **Dr Horatio C Wood, Jr**, well known author of medical and pharmaceutical textbooks **Prof E N Gathercoal**, chairman of the N F Revision Committee and **Dr Oscar W Bethea**, of Tulane University, received the honorary degree of 'Master of Pharmacy' from Philadelphia College of Pharmacy and Science The latter delivered the Commencement address

Among those knighted by King George on his birthday are Dr F G Banting, discoverer of Insulin and Major R G Archibald, director of the Wellcome Tropical Research Laboratories in the Sudan

Dr Frank Kirby has announced that beginning on Sunday June 24th it is expected to have weekly lectures on scientific subjects in the Hall of Science at the Century of Progress The first lecture of the series was given by Dr Arthur Osol assistant professor of Chemistry and Physics at the Philadelphia College of Pharmacy and Science on the topic, 'A B C of Vitamins"

Samuel S Dworkin has been named *associate editor* of 'Drug Store Retailing"

Sir Henry S Wellcome, a native of Wisconsin the Remington Medalist for 1934 was awarded the degree of Doctor of Science, *honoris causa*, by Marquette University, on June 13th The ceremonies took place at the Milwaukee Auditorium

Miss Edna Gleason, Stockton, Calif former president of the Southern California Pharmaceutical Association, and also of the Stockton Chamber of Commerce, was one of the speakers at the meeting of Texas Pharmaceutical Association held in Mineral Wells Miss Gleason represented the N A R D

Dr George F Zook, U S Commissioner of Education has resigned to accept the directorship of the American Council on Education His resignation will become effective on July 1st

Prof J A Haefliger, Basel Switzerland was elected vice president of the Society for the History of Pharmacy At this meeting an address was delivered by Professor Haefliger and among the number who listened to him were representatives of sixteen states and fifteen university pharmaceutical institutions, and many prominent in pharmacy and as members of organizations There were present the *Honorary Dean* of the Pharmaceutical Faculty, Paris, Dr F Hauser and Dr Labhardt

Dr A Richard Bliss, director of the Reelfoot Lake Biological Station, Tennessee, delivered the address at the 84th annual Commencement of Cincinnati College of Pharmacy

Dr P A Foote, professor of Pharmacy at the University of Florida, is spending the summer visiting points of pharmaceutical interest in Europe Part of the time is being spent in England, in Brussels he is studying crude drugs, and in other sections of Europe Dr Foote is finding interest in the museums, libraries and laboratories

Robert L Swain, former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, delivered the principal address at the Commencement Exercises of the Connecticut College of Pharmacy He was given the honorary degree of Doctor of Pharmacy, and the same honor was conferred on Robert P Fischelis, president of the A PH A Dr Robert L Swain delivered the address at the commencement exercises of the College of Pharmacy of Columbia University

Wilhelm Bodemann, veteran of veterans celebrated his 88th birthday on June 6th He was the recipient of congratulations from many friends in various sections of the country

T L Swenson, associate bacteriologist, Bureau of Chemistry and Soils, U S Department of Agriculture, was recently given a Kappa Psi (pharmacy fraternity) scholarship key Among those at the presentation were Carson P Tralley, president National Drug Trade Conference, Dr Swenson, Editor E G Eberle, W Bruce Philip N A R D counsel and Secretary E F Kelly

In recognition of his service to the drug industry and the pharmaceutical profession, the Indianapolis College of Pharmacy at its recent commencement exercises conferred the degree of Bachelor of Science in pharmacy on A Kiefer Mayer, Indianapolis

Peter A Brannon, a pharmaceutical chemist in Alabama, and for ten years in the profession, now curator of the Department of Archives and History of the State of Alabama, is a collector of glass bottles He is particularly interested in early blown bottles, and has some fine specimens of old original containers dating from about 1665 down to 1790 Some of those in his collection are proved of European make They were obviously, in the Indian trade and were preserved and buried with the natives

Mr Brannon is actively seeking the smaller globular show bottles of drug store days as late makes as 1875, and now finds that though they were quite common and in use as late as 1910, except in the hands of a few collectors and in the museums they cannot be found

Samuel C Davis, Nashville Tenn, has been appointed by NRA Administrator Hugh S Johnson to be an administration member of the code authority for the retail drug trade Mr Davis, a former member of the State Legislature of Tennessee, has owned and operated a number of drug stores although at the present time is not in the business

Dr Donald D Van Slyke, of the Rockefeller Institute for Medical Research, New York delivered the Charles E Dohme Memorial Lectures for 1934 at Johns Hopkins University School of Medicine April 26th–28th The "Physiology of the Amino Acids and "Factors Controlling Urea Excretion" were the subjects of the addresses

Z E Marvin, owner of a number of Dallas (Texas) pharmacies, is chairman of the local Society for Crippled Children and is working to raise a fund to help the unfortunate children of Dallas On the committee with him is Mayor Charles E Turner, a former druggist

Lieutenant Commander Louis H Roddis advises that "The Pharmaceutical Recipe Book" has been added to the approved list of professional books carried on the 'Standard Book List of the Supply Table of the Medical Department, U S Navy' This list is revised annually and will now be readily available to the medical activities of the ships and store stations of the Navy About 200 copies have already been asked for to meet the demand

W Bruce Philip, former president of the AMERICAN PHARMACEUTICAL ASSOCIATION has received the degree of Master of Law from the National University, Washington As is generally known Mr Philip is Counsel for the N A R D

F J Gleason, D D S, is now associated with the research work of Merck & Co, in a dental advisory capacity

William C Downey, Washington, *honorary president* for 1932–1933 (School of Pharmacy, U of Md), was one of the speakers at the Alumni Association Banquet of the University of Maryland *Fred Sultan, of St Louis* was elected *honorary president* for 1934–1935 Both of these are graduates of the class of 1884

E Allen Newcomb, son of Dr and Mrs **E L Newcomb**, Montclair, N J, was married June 3rd His bride was Miss Catherine Purcell, East Milton, Mass The young couple will reside in Indianapolis after July 1st, where Mr Newcomb will be associated with Eli Lilly & Co, pharmaceutical manufacturer Mr Newcomb was graduated with a Master's degree from the Harvard School of Business this year He received his B S degree from Massachusetts Institute of Technology in 1932

VETERAN DRUGGISTS ASSOCIATIONS HONOR SAMUEL L HILTON

Members of the Baltimore and Washington Veteran Druggists associations and their ladies met in joint session at the Olney Inn for the season's closing session, and honored Samuel L Hilton He was rather surprisingly informed that he was observing the fiftieth anniversary in the profession He has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1890, and has assisted in a number of revisions of the United States Pharmacopœia and the National Formulary He has held various high positions in organized pharmacy and was president of the A PH A in 1921–1922

Among the speakers were Edward A Smyser president of the Washington association, for the Baltimore association, Charles L Meyer, Robert L Swain former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, R E Lee Williamson, of the Federal Wholesale Druggists' Association, Editor E G Eberle, W Bruce Philip, attorney for the National Association of Retail Druggists at Washington and a former A PH A president A beautiful scroll, signed by all in attendance was presented to the guest of honor

Dr Hilton, recently presented a large assortment of books to the ASSOCIATION and has been instrumental in securing a number of other donations He has been interested in the building of the American Institute of Pharmacy, since the ground breaking

OBITUARY

W B Brazelton, Waco, Texas, president of Behrens Drug Co, died at his home, June 16th aged 77 years Mr Brazelton was not a pharmacist but interested in many commercial activities and civic affairs in Texas

WILLARD OHLIGER

Willard Ohliger, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1903, chairman of the Board of Directors and General Manager of Frederick Stearns & Company, died in Detroit, June 8, 1934, at the age of 56 He is survived by his widow

Willard Ohliger was born in Ohio and received his early education in his home town of Wooster Later he attended the Philadelphia College of Pharmacy from which he was graduated in 1900 with the degree of Doctor of Pharmacy Not satisfied with this training, he entered the University of Pennsylvania to continue the study of chemistry After graduation he came to Detroit and became identified with the House of Stearns entering as a chemist Very shortly afterward he was promoted to the position of chief chemist, having charge of the Analytical Department In 1905 he became general director of all manufacturing and then in 1911 superintendent of production In 1913 he was elected second vice president, in 1915 general manager and in 1916 first vice president and general manager In 1921 Mr Ohliger was elected president and general manager At the time of his death he was chairman of the Board of Directors and general manager

ROBERT G ECCLES

Dr Robert G Eccles member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1885 and active in the ASSOCIATION for many years died as a result of injuries sustained by being hit by a street car in Brooklyn N Y Dr Eccles was formerly a member of the faculty of Brooklyn College of Pharmacy a chemist for a number of years with the U S Department of Indian Affairs and editor of *Merck's Archives*

The deceased was born in Scotland and came to this country in his youth, in 1848 Until 1876 he was engaged in educational work in the West Before returning East he was married and on coming to New York Mrs Eccles entered the Women's Medical College in Manhattan and Dr Eccles began his medical studies at Long Island Hospital Both were graduated and received their degrees in 1882

DR I V S STANISLAUS

Dr Ignatius Valerius Stanley Stanislaus, associate professor of pharmacy in the Brooklyn College of Pharmacy, Long Island University, since 1923, and prominent in pharmaceutical and chemical circles, died suddenly of a heart attack while dining with friends at a New York restaurant June 1st He was born at South Bend, Ind about sixty years ago

Dr Stanislaus was a graduate of the School of Pharmacy of the University of Illinois and had taken degrees at Zurich as well as at Notre Dame Brooklyn and Providence in this country He was dean and professor of industrial chemistry in the Department of Pharmacy of the University of Notre Dame in 1896–1901, dean and professor of pharmacy and organic chemistry in the old School of Pharmacy of the Medico Chirurgical College, Philadelphia in 1906–1912, and was a special lecturer on drug chemistry at Temple University Philadelphia

MRS JOHN F HANCOCK

Mrs John F Hancock widow of the late Dr John F Hancock Baltimore, former president of the AMERICAN PHARMACEUTICAL ASSOCIATION 1873–1874, died June 21st In former years, she attended many meetings of the Association and remembrances of friends at these occasions entered into her delightful conversations also the visits of pharmacists, of earlier years at the home where are photographs of Procter, Parrish Maisch, Remington Shinn and many others and family paintings of those who contributed to Maryland and American history

The older members of the A PH A will remember Mrs Hancock when she was the center of visiting groups Until the last few days she was interested in passing events and her acquaintance with ASSOCIATION history, Maryland Pharmaceutical Association, and of Baltimore made visits with her entertaining In later years her physical infirmities made it difficult for her to move about, but her mind to the last was clear

For about forty years, the deceased was president of the Women's Auxiliary of the Free Summer Excursions, provided for the children of Baltimore

Mother Hancock was born January 13 1841, her living children are James E Hancock Miss Fannie Despeaux Hancock of Baltimore and Mrs E G Eberle of Washington D C The many beautiful flowers and messages spoke of the affectionate regard in which she was held

SOCIETIES AND COLLEGES

AMERICAN MEDICAL ASSOCIATION

The president-elect of the American Medical Association, Dr James Somerville McLester, comes to office with a distinguished career of service to organized medicine He was born in Tuscaloosa Ala , January 25, 1877 He received his A B degree from the Univerity of Alabama in 1896 and the M D degree from the University of Virginia Department of Medicine in 1899 Then followed postgraduate work at Gottingen and Freiburg in 1901 and 1902 He became professor of pathology and later professor of medicine in the Birmingham Medical College, holding this position from 1902 till 1912 This period also included postgraduate study in Berlin and Munich during 1907 and 1908 In the World War he acted as major and chief of medicine in the Base Hospital at Camp Sheridan and was promoted to lieutenant colonel in the American Expeditionary Forces, becoming commanding officer of Evacuation Hospital 20, in 1918 During this time he was a consultant in the medical service In 1919 following the World War he became professor of medicine in the University of Alabama School of Medicine

NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

Delegates from thirty four states participated in the deliberations of the National Association of Boards of Pharmacy, including Porto Rico One hundred per cent attendance was shown by Connecticut, District of Columbia, Kansas Maine, New Hampshire and North Carolina

A report of the Executive Committee recommended that the offices of the Association be moved to the American Institute of Pharmacy, Washington by May 1935 if possible

Congressman Thomas, of New York who is a pharmacist, was guest speaker at the banquet

Provisions were made for a scroll for the officers of the Committee on Pharmacy Exhibit, World's Fair

Dr Lopez, delegate from Porto Rico, delivered a message from the Island and gave an interesting account of pharmacy in Porto Rico

F W Hancock, of North Carolina was elected *Honorary President* Charles H Evans of Georgia, *President,* the *Secretary* and *Treasurer* were reelected

AMERICAN PHARMACEUTICAL MANUFACTURERS ASSOCIATION

Details of the tentative program for the annual meeting of the American Pharmaceutical Manufacturers Association to be held June 25th to 28th, inclusive on Cape Cod at the Chatham Bars Inn Chatham, Mass have been issued and the schedule includes a number of interesting and important subjects including addresses by prominent individuals in the industry

OFFICERS OF THE PROPRIETARY ASSOCIATION

The officers elected by the Proprietary Association at its recent annual meeting are as follows *President* Frank A Blair, New York City, *Honorary Vice President,* Dr V Mott Pierce, Buffalo N Y , *First Vice President* Henry P Bristol, New York City, *Second Vice President,* E K Hyde, Buffalo N Y , *Third Vice President,* James H Howe, St Louis Mo , *Secretary Treasurer* Charles P Tyrrell, Syracuse, N Y , *General Representative* E F Kemp, 425 Star Building Washington, D C , Harry B Thompson, 422 Star Building, Washington D C , *Executive Committee* Z C Patten Jr Chattanooga, Tenn , J F Hindes Baltimore, Md , A H Beardsley Elkhart Ind

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The ninety fourth meeting of the American Association for the Advancement of Science was held in Berkeley, Calif , from June 18 to 23, 1934 This is the fourth summer meeting of the association on the Pacific Coast previous meetings having been held at San Francisco in 1915 at Portland Oregon in 1925 and at Pasadena in 1931 All these have been joint meetings with the Pacific Division This year the University of California and the Pacific Division of the association are coöperating as hosts Sessions were held for the most part in lecture halls of the University of California on the campus at Berkeley As has been found desirable in summer meetings symposia and invited programs are emphasized and field trips are numerous

OFFICERS OF WEST VIRGINIA PHARMACEUTICAL ASSOCIATION

The following officers were installed for the current year *President* Fred C Allen Marlinton, *First Vice-President*, Robert R Pierce, Morgantown, *Second Vice-President*, Herman Wild, Huntington *Third Vice President*, H J Matthews Mannington, *Secretary Treasurer*, J Lester Hayman, Morgantown, *Council Member*, W R Crane Fairmont

The following were nominated, election to be made by mail ballot, for the Association officers to be installed at the next annual meeting *President*, Robert R Pierce, Morgantown, G S Flesher, Cairo, *First Vice President*, John A Greear Huntington E B Moore, Elkins *Second Vice President* James A Patterson, Martinsburg, J R Hertzog Worthington, *Third Vice-President*, H A Goodykoontz, Bluefield, W S Coleman, Lewisburg, *Secretary Treasurer*, J Lester Hayman, Morgantown Carl E Furbee, Clarksburg, *Council Member*, Chas V Selby Clarksburg, L C Harlan, Huntington

The next annual meeting will be held in the City of Parkersburg, in June 1935

Among the speakers of the convention were, Jerry McQuade, Albert Fritz Dr Roy B Miller, Fred L Fox, Thurston Merrell and F J Nichol

A resolution adopted is to the effect that pharmacists should be represented on the Board of Health The federation of State Pharmaceutical Associations was endorsed

OFFICERS OF MARYLAND PHARMACEUTICAL ASSOCIATION

Maryland Pharmaceutical Association elected the following officers *Honorary President*, H R Steiner *President*, Andrew F Ludwig, Baltimore, *First Vice President*, Harry W Matheney, Cumberland, *Second Vice-President* Melville Strasburger Baltimore *Third Vice President*, A A M Dewing, Centreville *Secretary*, E F Kelly Baltimore *Treasurer* Harry S Harrison, Baltimore *Editor*, Robert L Swain Baltimore *Executive Committee Chairman*, Charles C Neal, Baltimore, W B Spire, Mt Rainier, Aquilla Jackson, Baltimore, L V Johnson St Michaels, Samuel Y Harris Baltimore Simon Solomon, Baltimore

TEXAS BOARD OF PHARMACY

The Texas Board of Pharmacy held its final examination for non graduate pharmacists at Waco Texas, May 14th, 15th and 16th, with 203 applicants in attendance The Board elected new officers at the meeting They are John A Weeks, Ballinger, *President*, W H Cousins of Dallas was reelected *Secretary* C B Allison was reelected *Treasurer* All members of the Board, including J Dan Allen, Houston, Paul D Carroll, Texarkana, E E Weaver, Fort Worth, Erwin Joseph, Austin, Mr Weeks and Mr Allison were in attendance

C M Brewer, secretary of the Oklahoma State Board of Pharmacy, has been elected vice president of the National Association of Boards of Pharmacy Mr Brewer will preside over the sixth district, which includes Oklahoma, Texas Arkansas New Mexico, Kansas, Louisiana and Missouri

ALPHA ZETA OMEGA FRATERNITY

Members of sixteen chapters of colleges and schools of pharmacy met in Baltimore, June 24th Among the speakers were Doctors John C Krantz, Jr, E F Kelly and David I Macht

NARCOTIC THEFTS

Professional men and druggists, wholesale and retail are urged by the Bureau of Narcotics to store all narcotics under lock and key preferably in metal cabinets or safes, since the check up of many thefts by narcotic agents has shown that they were committed without trouble due to the use of wooden cabinets and unlocked cases Legal purveyors were cautioned also against letting the Government order forms issued to the drug trade and the medical profession fall into the hands of illicit traffickers and addicts

In addition to opium, morphine and heroin thefts, in the two year period, more than 700 ounces of cocaine, dionin, and other opium and coca leaf derivatives were stolen these drugs bringing considerable return in the illicit traffic when addicts find it difficult to obtain morphine or heroin While the manufacture of heroin is forbidden in this country, and the medical profession has voted against its general use, there are some small stocks on hand and it was from these stocks the thefts were reported

REFORM ADVERTISING

The newly formed advertising committee of the Proprietary Association will shortly establish headquarters in New York City with a staff of experts to make a study upon which to base its recommendations The new group has been

charged with the responsibility of developing a plan for voluntary advertising control, to eradicate such evils as exaggerated claims and bad taste An organization meeting in New York City during the week was attended by William Y Preyer, chairman, Lee H Bristol, chairman of the executive committee of the Association of National Advertisers, William S Groom, James F Hoge, legal expert, and Frank A Blair, president of the association

NEW JERSEY CODE MARK UP SUSPENDED

The fifteen per cent mark up provision contained in Article 12 of the code of fair competition for the retail trade in the State of New Jersey was suspended by the State Industrial Recovery Administrator, effective May 24th pending a study of distributive costs in the state The suspension was considered as only temporary however, and the provision may be either reaffirmed or revised within the next few weeks, depending on the results of the cost study

The action came as a surprise to retailers, inasmuch as the mark up had been granted for a trial period of sixty days and no change was expected before that time Since the code was approved by Governor A Harry Moore a few weeks ago the druggists had set up a code authority opened offices in the Industrial Office Building, Newark, and had circulated lists of prices including the mark up, for many nationally advertised products

BOOK NOTICES AND REVIEWS

Volumetric Analysis By H P STARCK M A , Head of the Science Department The Technical College, Kingston on Thames published by William Wood and Company Baltimore 1934, VIII + 228 + 31 pages Price $3 00

This text was originated in connection with the author s teaching of volumetric analysis to students reading for School certificate University Scholarship National Certificate and Pharmaceutical Medical and General examinations in chemistry in Great Britain Portions of the work are designated for certain classes of students by definite headings such as Inter and Final B Sc Students' 'For Degree Students," Estimations for All Advanced Students" The articles and preparations which should be estimated by pharmaceutical students have their Latin Titles mentioned in parentheses and exceptions are indicated by an asterisk

The subject matter includes a brief consideration of a large number of well known analytical processes Concise procedures are given and emphasis is placed on the explanation of equivalent weights The book is divided into five sections treating of I—Introduction, II—Acidimetry and Alkalimetry, III—Oxidation and Reduction, IV—Precipitation Methods, and V—Application Methods, appendices, index and qualitative analysis tables A number of well selected problems are included in each section

The book is well suited to the purposes for which it is intended no doubt Since we in this country do not have a type of examination similar to that which obtains in Great Britain it is not likely that a text covering so wide a variety of materials will find extensive use here The many pharmaceutical items treated of make the book of value and interest, however, to all who are engaged in the analysis of pharmaceutical chemicals—GLENN L JENKINS

The JOURNAL OF THE A PH A is indebted to Dr Edward Kremers, of the University of Wisconsin, for *Bulletin* Series No 1919, General Series No 1703, ' Phytochemistry ' by Edward Kremers and colaborers being No III of the Methane Series of Hydrocarbons '

NRA HANDBOOK

The National Recovery Administration has compiled an authoritative guide in the form of a 30 page document, entitled What Is the NRA?" Descriptions are given of the various steps taken in formulating codes and suggestions are advanced to show why no two codes of fair competition are alike They all must contain certain specified features

---

INTERNATIONAL RED CROSS SOCIETY

The International Red Cross Society will meet in Tokyo, October 19th to 29th Elaborate preparations are being made by the Japanese Red Cross Society for the annual meeting of the Red Cross Society in Tokyo which is to be held in the Japan Red Cross Society Building in Shiba Park

---

Reports of Local Branches had to be deferred to a succeeding issue of the Journal

MAINTENANCE AND ENDOWMENT FUNDS FOR THE AMERICAN INSTITUTE OF PHARMACY

FUNDS may be donated specifically for the maintenance of the Museum or of the Library of the American Institute of Pharmacy, for general research projects, for publicity for pharmacy, or for studies in any special field which may be suitable Such contributions may also be applied to any other specific purpose which the donor designates or they may be turned over to the general maintenance fund for the promotion and continuation of the other activities for which the Institute was established

Donations of materials or of funds to the Institution provide a splendid means of contributing to the advancement of pharmacy and to the improvement of the important public health service it renders, they provide the opportunity of contributing to the promotion of the profession which has given to many their opportunity and their success in life Donations may be named and suitable tablets or other acknowledgments will be provided in accordance with the wishes of subscribers Contributions may also be made in the name of the donor, of some other person or persons, or they may be made in the name of an institution which the donor wishes to commemorate Even though only small donations are possible, they add to the total and thus to the possibilities of service

For the convenience of contributors donations may be paid at once or over a period of years, they may be included in wills, they may be provided through life insurance or through trust estates, and they will be acceptable through any arrangement most convenient to the donor

The Constitution of the AMERICAN PHARMACEUTICAL ASSOCIATION provides that such funds as may be bequeathed or otherwise donated to it shall be invested in U S Government, State, Municipal, County or other securities acceptable as security for postal savings deposits In view of the scientific and educational nature of its work and since it is not operated for profit, donations to the ASSOCIATION may be deducted in computing income tax under the fifteen per cent proviso Full information relating to this matter will be furnished if desired

The American Institute of Pharmacy is a permanent service institution and also provides a splendid opportunity to memorialize those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy It is the hope of the ASSOCIATION that the work so auspiciously begun may advance by the generous support of all its members

ERNEST LITTLE

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII JULY, 1934 No 7

THE PRESIDENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY, 1934–1935

Ernest Little was born in Johnstown, N Y , June 9, 1888, the son of John and Martha Snook Little He received his earlier education in the elementary schools of his home city and Johnstown high school, from which he graduated in 1907 He pursued undergraduate work at the University of Rochester until 1911, when he was awarded the B S degree in Chemistry Here he continued graduate work, receiving the M S degree in 1913 His graduate work at the University was carried on under the direction of Dr Victor J Chambers, and largely in the field of nutrition, food and organic analysis, the thesis submitted was on "The Alkaline Copper Solution as Used in Sugar Analysis" It recorded a critical study of the various oxidation and reduction methods, both gravimetric and volumetric He then enrolled as a graduate student at Columbia University and was awarded the A M degree in 1918 The work followed the lines of his prior studies, including also physical and colloidal chemistry Continued graduate work at Columbia earned for him the Ph D degree, in February 1924 Research work for this degree was carried on in the department of analytical chemistry and was published in a treatise entitled "The Determination of the Acidity of a Tan Liquor," in which gross inaccuracies were shown in the methods heretofore employed and a simple accurate method involving the use of the cadmium half-cell was recommended

Dr Little has been a frequent contributor to various chemical publications and in recent years to pharmaceutical journals He is a member of Kappa Psi, Phi Beta Kappa, Sigma Psi and Phi Lambda Upsilon He is president of the Northern New Jersey Branch, A PH A , member of the Revision Committee U S P XI, chairman of the committee on Test Solutions and Reagents, Inorganic Chemicals, Tables, Weights and Measures He is member of the Committee on Membership Standards, A A C P and of the Standing Committee on Chemistry of the boards and colleges, District No 2 He is president of the Board of Education of Highland Park, N J , and member of the Board of Directors of Newark Rotary Club

In 1910, Dr Little was assistant in Physics and Mathematics at Mechanics In-

stitute, Rochester, from 1911–1914, he was member of the faculty of Rochester University, 1914–1918 he was instructor in Leather Chemistry at Pratt Institute, Brooklyn, and from 1918–1928 member of the faculty of Rutgers University professor of Physics and Chemistry, New Jersey College of Pharmacy (Rutgers University College of Pharmacy) and since 1926, dean and professor of Chemistry

---

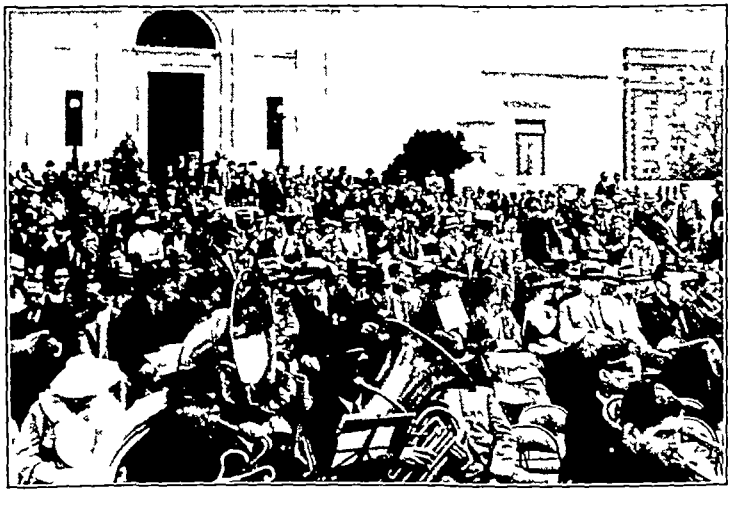
"PROFESSIONAL" IN THE RETAIL CODES

The following is taken from *The Blue Eagle* of June 25th

"A 'professional' in the retail trade has been defined by the National Recovery Administration

"Under the definition given only the following can be properly classified as professionals Chemists, physicists, dentists, physicians and surgeons, registered nurses, chiropodists, pharmacists, optometrists, architects, artists and creative decorators, training directors whose entire time is devoted to education or training, research technicians, statisticians, engineers (who hold degrees from qualified institutions of higher learning)

"The interpretation defines as a professional 'a person whose work is (1) Predominantly intellectual or mental in character as opposed to purely physical work or work involving the application of manual, mechanical, physical or operative technique or skills, and (2) based upon educational training in a specially organized body of knowledge as distinguished from training of a manual, mechanical or operatively technical type, or the performance of routine mental processes in accordance with a previously indicated or standardized formula, plan or procedure, and (3) of a nature that is creative and cannot be carried on by anyone not having a similar training or qualifications without losing its unique characteristics'"



View of Dedication Ceremonies of American Institute of Pharmacy

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave WASHINGTON, D C

HEROES IN HEALTH SERVICE

HISTORY abounds in records of valor stimulated by patriotism in defense of country and the world The acts longest and most generally remembered are those wherein lives are sacrificed in their country's cause, memorials are erected so that their names and deeds may be reminders of duties and service honorably rendered

Paintings, statues and printed pages remind us of outstanding deeds in military service and dedications to the unknown, honoring those who in large numbers had an essential part in the success of a just cause

The memory of those who have achieved great things in public health matters lives in the results of their researches, whereby sections of the world have been made habitable, destructive diseases have been conquered, and painful and burdensome afflictions have been made more bearable Among these benefactors are scientists who suffered greatly so that others may be happier and more comfortable, individuals characterized by heroic unselfishness, thinking modestly of themselves, but intensely desirous of aiding the afflicted, their viewpoint regarding them reaches millions represented in types they know and with whom they sympathize, because of their affliction

In the class referred to are many, their services differ, but all of them have made signal contributions to health, prosperity, discovery, education, commerce, industry, arts and professions, all closely linked in the benefactions derived from devotion, labor, study, investigation and, above all, the loftiness of purpose which prompts their efforts Reference may be permitted to discoveries which have converted to livable areas in which life was constantly endangered by disease and thereby development made impossible, laboratories conducting research are not free from dangers and its workers receive cooperation from laymen who desire a part in discoveries that may result in disease immunity, citing as a recent example the volunteers to submit themselves as tests for the efficacy of anti-paralysis serum There may also be included the hardships of carriers of food and medicines to afflicted sections Yellow fever was conquered because of the heroism of Gorgas, Lazear, Finlay, Agramonte, Reed and others, the achievements in Cuba and the Canal Zone were heroic and of inestimable value not merely through the immediate benefits and benefactions, but by proving that disease can be controlled and plagues checked, of which there is continued evidence

This editorial comment was prompted by the passing of a heroine, the discoverer of radium, Madam Marie Curie, who endured the hardships of poverty in early life and had the courage to carry on, resulting in her great achievements, she could appreciate that fortune was with her when she found employment at Sorbonne cleaning the furnace and washing bottles in the laboratory, and modestly accepted recognition of the great honors which came to her not very many years later With her passed out a heroine and one of the prominent figures in science and an outstanding benefactress of humanity One of the great days in her life was May 20, 1921,

when she received the gift of radium through President Harding, not for herself, but because she realized its great value for the afflicted, whom she relieved and served The effect of radium made itself known in her health and exacted its toll During the few days prior to her death Mme Curie gave directions concerning experiments being conducted in her Paris laboratory, and, later, she gave directions for her funeral

"Heroism is active genius, genius, contemplative heroism Heroism is the self-devotion of genius manifesting itself in action "

THE SERVICE OF PHARMACY

THERE is a growing development of the service of pharmacy and a greater realization of the need of closer cooperation of those engaged in the medical professions Discussions of the subject occupied much of the time at the recent AMERICAN PHARMACEUTICAL ASSOCIATION meeting in Washington, and at state medical meetings there was an evident desire to gain a better understanding of how to prescribe and how cooperation of the physician, dentist and pharmacist may serve the patient better This desire is in evidence everywhere, to impress that, parts from two addresses are quoted—one delivered before the pharmacists in Edinburgh, Scotland, and the other in far-off Bengal

Dr J M Johnston, pharmacologist to the Scottish Department of Health and a member of the Poisons Board set up under the Pharmacy and Poisons Act, 1933 (Great Britain), said in closing an address to the Edinburgh pharmacists that "the pharmacist has a part to play in the question of the use and misuse of drugs There is ample scope for the education of the public, and also, as opportunity arises, for the education of the medical profession I hope the pharmacists will rise to the occasion, and, steering clear of the dangers of commercialism, will raise the pro fession of pharmacy to its proper place in the battle against disease Much of the analytical work at present undertaken by pharmacologists could more properly be left to the pharmaceutical chemist, for whom there is also awaiting the promising field of biochemical investigations which are so necessary for modern clinical medi cine The keynote for the future of the pharmacist would appear to be a combined policy of education and investigation "

Lieut -Col Chopra opened his presidential address to the All-Bengal Com pounders' Association by saying that "as a pharmacologist who has to work with drugs I am very interested in the profession of pharmacy which you practice The important part which pharmacists play in relation to drugs needs no special em phasis You, as their representatives in this country (Bengal), are the custodians of drugs You prepare and compound drugs and on your efficiency depend the purity and efficacy of the preparations dealt with by you Your relation to the practice of medicine in every-day life is intimate and you are an integral part of it The busy physician dealing with diagnosis and treatment of disease has no time at his disposal to dispense his own medicine as he used to do in the old days Phar- macy has developed enormously along with medicine and the wider scope of the two sciences makes it impossible for the medical practitioner to devote himself sys tematically to the study of pharmacy In matters of drugs, their preparation and

dispensing, therefore, the physician has to depend entirely on the advice and guidance of the pharmacist The physician has sometimes to use very potent drugs which require to be handled with the most exact and scrupulous care Skilful dispensing is essential for the successful treatment of disease by those practicing medicine "

"A Suggestion for the Establishment of a National Council on Pharmaceutical Practice," has as the first objective a study of the needs of each field of activity and then a preparation for announcing these needs to the country, it also is proposed to make a restatement of codes of ethics and practice, for each group as the basis for a high professional standard

CODES

THE great hindrance in undertakings to be overcome is selfishness and the desire to stand out in public appreciation This, frequently, is also true in legislation, for while all statesmen are politicians, not all politicians are statesmen The work of recovery depends upon honesty, initiative, understanding, self-reliance and resourcefulness to meet conditions as they arise

The greater number of druggists have expressed themselves as favorable to a continuation of the National Retail Drug Code, and the *Literary Digest* survey shows that more than sixty per cent are in favor of the New Deal policy

The first year of NRA was devoted chiefly to codifying industry, more than four hundred basic codes of fair competition have been put into operation, representing 96 per cent of trade and industry in the United States, the next year's work will largely be directed to the enforcement of the codes

As seen from the press there is contemplated a reorganization of the Recovery Administration under a board, instead of a single administrative head The question arises as to the kind of administrative agency is best adapted to carry on the activities of the NRA When the change will be made seems to be undecided, however, the surveys indicate that the life of the Recovery Administration will be indefinitely prolonged The size of the administrative body has not been determined, but there is quite general expression that the members should have well-defined duties and share in the responsibilities of the administration and the work of the administration should be placed on a broader basis

Notwithstanding the different opinions as to the workings of the NRA we should seek and encourage "the greatest good for the greatest number," and "the highest law is that created to relieve the imperative needs of the people "

PHARMACY EXHIBIT AT PROGRESS OF SCIENCE

When you are in Chicago see the Pharmacy Exhibit The AMERICAN PHARMACEUTICAL ASSOCIATION is, as last year, sponsoring the exhibit A significant indication of the enthusiastic approval given last year's enterprise is the fact that the committee this year received almost 100 per cent favorable responses from participants to the questionnaire sent to the leading contributors to the 1933 exhibit The pharmaceutical showing of last year proved to be one of the most popular of the exhibits in the medical division

SCIENTIFIC SECTION

THE ABSORPTION OF CALCIUM *

(A PRELIMINARY REPORT)

BY A RICHARD BLISS, JR ,[1] ELLSWORTH O PRATHER, JR ,[2] AND ROBERT W MORRISON [3]

INTRODUCTION

The metabolism of calcium is intimately related to the calcium and phosphorus content of the ingested food, the activity of the parathyroids, vitamin D and possibly vitamins A and C Normally, the blood serum contains from 9 0 to 11 mg of calcium per 100 cc (1), but in sickness and wasting diseases the amount is lower In some forms of tetany (2) it has been found occasionally less than half the normal Updegraff, Greenberg and Clark (3) found that approximately 50 per cent of the total serum calcium is *non-diffusible* or bound calcium, and the remainder is *diffusible*, but Kugelmass and Shohl (4) showed that only a portion of the diffusible calcium is ionized Some are of the opinion that *ionic calcium* is the active portion, and that the serum calcium is consequently not a true index of the calcium balance Since ionic calcium diminishes cell permeability (5), excessive amounts decrease cellular activity

It has been estimated that 99 per cent of the calcium in the body is stored in the bones and teeth as phosphate and carbonate These compounds provide a reserve to keep the blood calcium normal Vitamin D is concerned in the development of the teeth, and Bauer and Marble (6) have demonstrated that this vitamin increases the absorption of calcium and phosphorus from the gastro-intestinal tract In low calcium supply and in chronic states of debility, the bones slowly atrophy through being thus drawn upon for calcium In acidosis the bone calcium is apparently not readily available Although the average adult requires about 0 45 Gm of calcium a day, Sherman (7), to insure the optimum concentration in the blood for both adults and children, advises a minimum of 1 Gm Sherman and Booher (8) have shown that in growing children the bones may grow in size while calcium poor During lactation and in the last months of pregnancy, the mother requires double the usual supply of calcium, and, if it is not furnished by the food, loses it from her own bones and teeth Rickets is associated with inadequate calcification of the bones, and is dependent on derangement of calcium and phosphorus metabolism It is well known that premature infants are especially predisposed to rickets, since they have less than the normal supply of calcium and phosphorus at birth

Absorption of calcium takes place in the intestines, but it is influenced by a number of factors Absorption is *diminished* by (A) an *excess of phosphorus* in

---

* Scientific Section, A PH A , Madison meeting 1934

[1] Director of the Reelfoot Lake Biological Station, Reelfoot Lake, Tennessee

[2] Instructor in Pharmacology University of Tennessee

[3] Associate Professor of Pharmacology, University of South Carolina

the food, resulting in the formation of the unabsorbable tribasic calcium phosphate, (B) an *excess of fat* in the diet or the incomplete utilization of fat, resulting in the formation of insoluble calcium soaps, (C) *intestinal alkalinity*, as from the ingestion of alkalies, or after meals when there is an abundance of the alkaline pancreatic and intestinal juices and bile (Zucker and Matzner (9) by adding sodium bicarbonate to the diet produced rickets in rats), (D) *hurried loose stools*, as in diarrheas, (E) *stools bulky with cellulose* and roughage The greater the bulk of the feces, following the ingestion of bran, carrots, spinach, agar, and cellulose flour for bulk, the greater is the loss of calcium

The absorption of calcium is *favored* by (A) *intestinal acidity*, as that which may follow the administration of diluted acids, acidified milks and acidotic diets (Aub, *et al* (10) claim that an acidotic diet may double the urinary calcium, an indication of increased absorption, but if a neutralizing amount of sodium bicarbonate is given with this diet, the urinary calcium is not increased), (B) *the addition of lactose to the food*, which according to Roe and Kahn (11) is probably due to the formation of lactic acid in the intestines

Calcium chloride and calcium lactate have been extensively studied to determine their absorbability when given orally Clark (12) with rabbits, Kramer and Howland (13) with rats, and Denis and Minot (14) and a number of others with humans, obtained no significant rise in the blood calcium However, some observers have reported their absorption From single doses of 5 Gm in each of nine human subjects, Aub, Bauer, Heath and Roper (15) reported a rise of 5 to 14 per cent, and from 10 Gm in eight subjects, a rise of 5 to 28 5 per cent The maximum rise was found between the first and the fifth hours, and in thirteen of the seventeen subjects, the calcium did not return to the pre-ingestion level for twelve hours With 5 Gm doses of the lactate dissolved in water and given on an empty stomach, Roe and Kahn (11) obtained in ten men an average maximum rise in blood calcium of 80 per cent at six to seven hours, the calcium remaining above normal for nine hours, while with 2 Gm doses they obtained an average maximal rise of 41 per cent at six hours, the calcium remaining above the pre-ingestion level for one and one-half hours longer Mason (16), Myers and Fine (17), and others reported the lactate inefficiently and the chloride readily absorbed

According to Meltzer (18), the most effective way to deprive the body of calcium is to give magnesium Mendel and Benedict (19) and others have demonstrated that magnesium forces calcium from the system It appears that an excess of magnesium ion exercises a marked specific inhibitory effect on calcification (20, 21, 22, 23) Kramer, *et al* (24) found that, following the administration of magnesium chloride or sulphate, the inhibition of calcification began when the magnesium of the blood rose above normal They reported also that as the inorganic phosphorus increased more magnesium was required for the inhibition It appears that there may be some hazard in the repeated administration of milk of magnesia, at least to children or to those with fractured bones A diet deficient in calcium is the more harmful if it is at the same time rich in magnesium Since the magnesium of the cereal grains is mostly in the bran, some pediatricians advise against bran and whole wheat for children In milk and many vegetables the calcium is high and the magnesium low

THE METHOD

The method is based on the antagonism between magnesium and calcium, which, in earlier experiments was observed in animals narcotized by magnesium and awakened by injections of calcium chloride In these experiments white mice were used The calcium salts were given by mouth, and, after a certain length of time, the magnesium sulphate ($MgSO_4 7H_2O$) was injected subcutaneously At the same time controls were run If some of the ingested calcium were absorbed, then a greater amount of magnesium sulphate is necessary to produce narcosis than is the case where no calcium is given or absorbed

For from twelve to fifteen hours before the calcium salts were administered the mice received no food or water The calcium salts were given in 3% to 10% aqueous solutions or suspensions injected into the stomach by means of a thin stomach tube fitted with a small syringe The time interval between the feeding of the calcium and the injection of the magnesium was two hours Magnesium sulphate was injected subcutaneously in a 10% aqueous solution A definite degree of narcosis was required which the authors determined to be at the point where the mice lie on their backs without movement or attempts to turn over This degree of narcosis is usually reached by effective doses in from twelve to twenty minutes after the injection

On the basis of an extensive series of preliminary experiments (Table I), 0 9 mg of magnesium sulphate per Gm of body weight proved to be just sufficient to produce the desired state of narcosis in the mice The amount of each calcium salt administered in mg per Gm of body weight is equivalent to 0 3 mg of calcium per Gm of body weight

TABLE I —MAGNESIUM SULPHATE ($MgSO_4 7H_2O$)

Wt (Gm) of Mouse	Dose of $MgSO_4$ Mg per Gm	Effect	Time to Action
18 27	0 75	None	
18 04	0 75	None	
23 81	0 75	None	
20 32	0 75	None	
14 75	0 80	Partial narcosis	18 min
21 30	0 80	"	17 min
18 70	0 80	"	20 min
15 25	0 80		30 min
18 70	0 90	"	20 min
16 45	0 90	"	20 min
14 62	0 90		20 min
18 24	0 90	"	20 min
14 70	0 95	"	18 min
26 56	0 95	Complete narcosis	16 min
17 20	0 95	"	17 min
18 00	0 95	"	16 min
14 00	1 00	Complete narcosis	20 min
15 70	1 00	"	18 min
25 65	1 00		17 min
18 58	1 00		17 min
18 63	1 50	"	14 min
20 46	1 50		12 min
17 00	1 50	"	7 min
18 40	1 50	"	10 min

TABLE II —CALCIUM CHLORIDE

Wt (Gm) of Mouse	Mg of CaCl per Gm Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
20 85	0 82425	1 0	
21 75	"	1 0	
21 84	"	1 0	
16 77		1 25	Partial, 20 min
23 55	"	1 25	Partial, 31 min
28 50		1 25	Partial, 26 min
23 75	"	1 50	Complete 18 min
19 52		1 50	Complete, 15 min
18 60	"	1 50	Complete, 13 min

TABLE III —CALCIUM LACTATE

Wt (Gm) of Mouse	Mg of Lact per Gm Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
24 37	1 63635	0 90	
19 61		0 90	
22 98		0 90	
24 76		1 00	
21 86		1 00	
22 86	"	1 00	Partial
23 70		1 25	
22 40	"	1 25	"
17 38		1 25	
18 77		1 50	Partial
20 41		1 50	Complete, 20 min
22 43	"	1 50	Complete, 17 min
21 57		2 00	Complete 10 min
17 82		2 00	Complete, 11 min
22 50		2 00	Complete, 15 min

TABLE IV —CALCIUM GLUCONATE

Wt (Gm) of Mouse	Mg of Glucon per Gm Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
18 91	3 364215	0 90	
21 43		0 90	
17 19		0 90	
18 23		1 00	Partial, 20 min
18 23		1 00	Partial, 30 min
22 83		1 00	Partial, 24 min
22 00		1 25	Partial, 20 min
21 00		1 25	Partial, 22 min
22 72		1 25	Partial, 20 min
21 67		1 50	Partial, 20 min
17 00		1 50	Complete, 20 min
18 62		1 50	Complete 20 min
23 16		2 00	Complete 14 min
16 95	"	2 00	Complete, 11 min
18 82		2 00	Complete, 12 min

TABLE V —CALCIUM DIPHOSPHATE

Wt (Gm) of Mouse	Mg of Diphos per Gm Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
16 82	1 29375	0 9	
21 69	"	0 9	
17 52	"	0 9	
19 66	'	1 0	Partial
15 15	"	1 0	'
21 57		1 0	"
21 00	"	1 25	Partial, 20 min
17 30	"	1 25	Complete, 13 min
21 30	'	1 25	Complete, 12 min
17 67	"	1 50	Complete, 12 min
23 77	"	1 50	Complete, 10 min
20 46	"	1 50	Complete, 5 min

TABLE VI —CALCIUM GLYCEROPHOSPHATE

Wt (Gm) of Mouse	Mg of Glyceroph per Gm of Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
20 34	1 6115	0 9	Partial
19 50	"	0 9	'
16 85	'	0 9	"
15 12	'	1 0	Complete, 20 min
16 10		1 0	Partial
18 00	'	1 0	Complete, 8 min
19 00	'	1 25	Complete, 20 min
19 50	'	1 25	Complete, 9 min
22 72	"	1 25	Complete, 8 min
23 00	'	1 50	Complete, 7 min
20 09	'	1 50	Complete, 11 min
16 54	"	1 50	Complete, 12 min

TABLE VII —INOSITE HEXACALCIUM GLUCONATE

Wt (Gm) of Mouse	Mg of Inosite Comp per Gm Body Wt	Dose (Mg per Gm) of $MgSO_4$ 2 Hrs after Ca	Time to Narcosis
16 82	1 20096	0 9	
21 82	'	0 9	
19 77	"	0 9	
17 62	'	1 0	
18 00	"	1 0	Partial, 20 min
21 76	'	1 0	Partial, 20 min
17 18	'	1 0	Partial 20 min
18 75	'	1 0	Partial, 20 min
17 56	"	1 0	Partial, 20 min
15 00	'	1 25	Partial, 20 min
16 37		1 25	Partial, 20 min
15 00	'	1 25	Complete, 20 min
18 66		1 25	Partial, 20 min
18 80	"	1 25	Partial, 20 min
20 17	"	1 25	Complete 15 min
20 00		1 25	Complete, 13 min
18 00		1 50	Complete, 10 min
20 00	'	1 50	Complete, 20 min
22 86	'	1 50	Complete, 20 min

21	80	"	1 50 Complete, 19 min
22	85	"	1 50 Complete, 13 min
17	44	"	1 50 Complete, 11 min

TABLE VIII —SUMMARY

Drug	Amt $MgSO_4$ Causing Partial Narcosis	Amt $MgSO_4$ Causing Complete Narcosis
Calcium chloride	1 25* (3 out of 3)	1 50* (3 out of 3)
Calcium lactate	1 00 (1 out of 3)	
	1 25 (3 out of 3)	
	1 50 (1 out of 3)	1 50 (2 out of 3)
		2 00 (3 out of 3)
Calcium gluconate	1 00 (3 out of 3)	
	1 25 (3 out of 3)	
	1 50 (1 out of 3)	1 50 (2 out of 3)
		2 00 (3 out of 3)
Calcium diphosphate	1 00 (3 out of 3)	
	1 25 (1 out of 3)	1 25 (2 out of 3)
		1 50 (3 out of 3)
Calcium glycerophosphate	0 90 (2 out of 3)	
	1 00 (1 out of 3)	1 00 (2 out of 3)
		1 25 (3 out of 3)
		1 50 (3 out of 3)
Inosite hexacalcium gluconate	1 00 (5 out of 5)	
	1 25 (4 out of 7)	1 25 (3 out of 7)
		1 50 (6 out of 6)

* mg $MgSO_4 7H_2O$ per Gm of mouse

DISCUSSION

In Table I are shown the effects produced by various amounts of magnesium sulphate ($MgSO_4 7H_2O$) Nine-tenths of a milligram (0 9 mg) per Gm of body weight was shown to be the amount required to produce the desired state of narcosis in white mice

Tables II through VIII show the effects produced by magnesium sulphate in various doses following the oral administration of equivalent quantities (Ca) of the six calcium compounds studied By subtracting 0 9 mg from the magnesium sulphate values given in these tables (II–VIII), the amounts of magnesium sulphate required to completely antagonize the *absorbed* calcium are obtained The greater the quantity of magnesium sulphate required to produce the narcosis, the larger the amount of *absorbed* calcium

When arranged according to relative efficacy the calcium compounds used in this study place themselves in the following order

(1) Calcium lactate
(2) Calcium gluconate
(3) Calcium chloride
(4) Inosite hexacalcium gluconate
(5) Calcium diphosphate
(6) Calcium glycerophosphate

When arranged quantitatively according to the actual amounts of the calcium compounds themselves administered and expressed in grams per Gm of body weight of mouse, the order is

(1)	Calcium chloride	0 00082425
(2)	Inosite hexacalcium gluconate	0 00120096
(3)	Calcium diphosphate	0 00129375
(4)	Calcium glycerophosphate	0 00161150
(5)	Calcium lactate	0 00163635
(6)	Calcium gluconate	0 00336241

The foregoing quantities represent equivalent amounts of calcium

Attention is called to the fact that this preliminary study leaves relatively wide gaps between the various quantities of magnesium sulphate used to neutralize the absorbed calcium (gaps between 1 0 and 1 25, 1 25 and 1 50, 1 50 and 2 00), and also that but one time interval (2 hours) was involved Consequently further studies are underway in which the effects of longer time intervals between the doses of the calcium compounds and the doses of the magnesium sulphate are being recorded, as well as the effects of increases of 0 1 mg of magnesium sulphate per Gm of body weight of mouse between the values (1 0 and 1 25, 1 25 and 1 50, 1 50 and 2 00) which appear in the present tables

BIBLIOGRAPHY

(1) A Cantarow 'Calcium Metabolism and Calcium Therapy," 2nd Edition (1933) 39
(2) A Cantarow, *Ibid* 2nd Edition (1933), 136
(3) H Updegraff, D M Greenberg and G W Clark, *J Biol Chem*, 71 (1926), 87
(4) I Kugelmass and A T Shohl, *Ibid*, 58 (1923–1924), 649
(5) J Loeb, *Am J Physiol*, 5 (1901), 362
(6) W Bauer and A Marble, *J Exptl Med*, 49 (1929) 145
(7) H C Sherman ' Chemistry of Foods and Nutrition, ' 4th Edition (1932)
(8) H C Sherman and L E Booher, *J Biol Chem*, 93 (1931), 93
(9) T F Zucker and M J Matzner, *Proc Soc Exptl Biol Med*, 21 (1923–1924), 186
(10) J C Aub, W Bauer, C Heath and M Roper *J Clin Investigation*, 7 (1929) 97
(11) J H Roe and B S Kahn *J A M A* 88 (1927), 981
(12) G W Clark *J Biol Chem*, 43 (1920) 89
(13) B Kramer and J Howland, *Ibid*, 43 (1920) 35
(14) W Denis and A S Minot *Ibid* 41 (1920), 357
(15) J C Aub, W Bauer W Heath and M Roper *J Clin Investigation* 7 (1929), 97
(16) E H Mason *J Biol Chem*, 67 (1926), 71
(17) V C Myers and M S Fine *Proc Soc Exptl Biol Med*, 16 (1919), 73
(18) S J Meltzer, *Ibid* 10 (1913) 159, and *J Pharm*, 12 (1918), 211
(19) L B Mendel and S R Benedict, *Am J Physiol*, 25 (1909–1910), 23
(20) J Novi, *Zentr Biochem Biophys* 13 (1912), 578
(21) J Hellwig, *Z Biol*, 73 (1921), 281
(22) E B Hart and K Steenbock, *J Biol Chem* 14 (1925), 75
(23) I Greenwald and J Gross, *Ibid* 66 (1925), 185, and 201, 68 (1926), 325
(24) B Kramer, F F Tisdall and J Howland *Am Jour Diseases Children*, 22 (1921), 560

THE SOLUBILITY OF CALCIUM LEVULINATE IN WATER

BY GERALD J COX,[1] MARY L DODDS[2] AND CLARENCE CLASPER [3]

Calcium levulinate has been shown to be more satisfactory for parenteral administration of calcium than any other known salt (1, 2) Anticipating the prob

[1] Senior Industrial Fellow [2] Industrial Fellow [3] Fellowship Assistant

able early adoption of this compound in therapeutics, we have determined the solubility of calcium levulinate in water over a range of temperature as an aid in the technology of both the preparation of solutions and the purification of the salt by crystallization

The calcium levulinate samples for this study were purified by repeated crystallization from water and alcohol mixtures and dried in air at room temperature The criteria of purity were the absence of color in concentrated solutions and the calcium content The latter was determined by permanganate titration of the precipitated calcium oxalate from nine samples and found to average 13 33% calcium compared with the theoretical value of 13 09% from $Ca(C_5H_7O_3)_2\ 2H_2O$

Saturated solutions of calcium levulinate in distilled water were prepared by immersion in appropriate baths at seven different temperatures of (1) water and excess calcium levulinate, and (2) solutions of calcium levulinate saturated at higher temperatures After about six hours, samples were withdrawn isothermically and weighed Calcium was determined on aliquots of the samples by permanganate titration of the precipitated oxalate The temperature of saturation was determined by means of short stem immersion thermometers calibrated by the Bureau of Standards

The means of at least four determinations at each temperature were used in the calculation of an equation which shows the composition of a saturated solution at temperatures from 0° to 55 4° C This equation is

$$p = 27\ 58 + 0\ 173t + 0\ 0031t^2$$

in which 'p' is the number of grams of calcium levulinate, $Ca(C_5H_7O_3)\ 2H_2O$ per hundred grams of solution and 't" is temperature in centigrade degrees

Comparison of the observed solubilities with those calculated from the equation are shown in Table I

TABLE I

Temp °C	Mean p Observed	p Calc'd
0	27 6	27 58
15 8	31 1	31 08
25 0	34 0	33 81
30 0	35 5	35 56
37 0	38 7	38 32
45 3	41 4	41 48
55 4	47 0	46 67

For "p" = 100, "t" is found to be 127 4° C The temperature, 127 4° C therefore is the calculated point at which calcium levulinate dissolves in its water of crystallization Melting points for the material used were found to range from 108° to 125° C depending on the rate of heating The latter melting point was obtained by immersion of open capillary melting point tubes in a bath at 125° C The time rate of melting was approximated to those of benzoic acid in a bath at 122° C and of urea at 132° C As the observed melting point is in fair agreement with the calculated, the equation can be applied safely for temperatures above 55 4° C, the maximum used in this study

LITERATURE CITED

(1) B Gordon, O S Kough and A Proskouriakoff, *J Lab Clin Med* 18 (1933), 507
(2) G D Greville and E C Dodds, *Brit Med J*, 190 (1931), II

CONTRIBUTION FROM THE SUGAR FELLOWSHIP,
MELLON INSTITUTE OF INDUSTRIAL RESEARCH,
PITTSBURGH, PA

PHYTOCHEMICAL NOTES *[1]

No 110 DIGITONIN AND PHYTOSTEROL FROM THE SEED OF DIGITALIS PURPUREA

BY OLE GISVOLD

A kilo of seed, not comminuted, was extracted with a liter of alcohol in a continuous extraction apparatus for 8 hours and the extract tested for digitonin with cholesterol The extraction was repeated with a like amount of solvent for 10 hours and a third time for 12 hours The third extract gave but a slight precipitate with cholesterol

The same process was repeated with comminuted seed So far as the digitonin was concerned, the results appeared to be about the same However, the comminuted seed gave up more of its fatty oil These results might have been anticipated, since the digitonin is located in the seed coating, whereas the fatty oil is located in the cotyledons

The balance of the available seed, 25 pounds, all of which had been raised in the Garden of the Pharmaceutical Experiment Station under the direction of Prof W O Richtmann, was ground and extracted in the Lloyd extractor

The first alcoholic concentrates removed had separated a considerable amount of fat with which was mixed a solid substance that was removed by force filter Hence the alcoholic concentrate yielded two products, *viz*

1 The solid that remained in the filter and which was shown to be a digitonide, and digitonin

2 The filtrate which consisted of the alcoholic extract plus dissolved and separated fat

1 Purification and identification of the digitonide The greenish material which had remained in the filter was several times suspended in hot petroleum ether to remove fat which was added to the other petroleum-ether extracts After that it was suspended several times in hot alcohol to remove any alcohol-soluble material The substance thus purified was designated "A," the combined alcoholic filtrates were designated "B"

(A) The purified and pulverized solid weighed 18 5 Gm It was suspected to be digitonide, since the digitonin from the seed coats and the sterol from the cotyledons would naturally be brought together in the alcoholic extract In so far as the two dissolved substances met within the tissue of the seed, the insoluble digitonide resulting should be found in the extracted marc In so far as the two substances reacted in the percolate, they would precipitate each other

---

* From the laboratory of Edward Kremers

[1] Scientific Section, A PH A, Madison meeting 1933

In order to test this hypothesis, the substance was treated with boiling xylene in the usual manner (1) The extract precipitated digitonin (2) and gave good positive color reactions with both the Liebermann-Burchard (3), and the Salkowski (4) tests Hence it was pronounced a sterol It melted at 137° to 138° (5) and yielded an acetate which melted at 130° to 131° No change in the melting point of the alcohol could be observed when mixed with the sterol obtained from stramonium seed According to Windaus' test, it contained no stigmasterol (6) Culter reports that the sterol isolated by him (7) melted between 93° and 105°, which very fact proclaimed it as impure Examination revealed his impure sterol to contain hydrocarbons, too minute in quantity to be identified When purified by the removal of this hydrocarbon it had the same melting point as that found by the writer

The residue in the extraction capsule was digitonin It had the capacity to precipitate sterols, also gave the Keller color reaction (10)

(B) The alcoholic filtrate "B" upon cooling and standing yielded a light greenish precipitate Its solution in 85 per cent alcohol, after boiling with animal charcoal, yielded a colorless filtrate which upon cooling deposited a white crystalline material Inasmuch as it had the capacity to precipitate cholesterol, it was assumed to be digitonin It likewise gave a positive Keller color reaction (11)

The original alcoholic concentrate, from which the substances described above had been removed by filtration, was defatted in a manner described and illustrated in another paper (8)

I The petroleum-ether residue, consisting, no doubt, for the most part of fatty oil, was set aside Culter not long ago reported on the constituents of the fatty oil of digitalis seeds (7) If deemed desirable, the fat may be reexamined later

II To the defatted alcoholic concentrate, heated almost to the boiling point, successive portions of cholesterol (9) dissolved in 95 per cent alcohol were added until no further precipitate occurred The combined precipitates were suspended several times in hot alcohol to remove alcohol-soluble impurities The air-dried and powdered material weighed 275 Gm

The digitonide thus obtained was decomposed in 15-Gm portions, with boiling xylene in the usual manner (1) The mixed, impure digitonin was extracted four times with hot 95 per cent alcohol To the first extraction, while warm, ether was added until the cloudiness first produced just disappeared Upon cooling, the digitonin crystallized out The subsequent extractions were concentrated before the ether was added to the warm concentrate From the mother liquids additional digitonin was obtained by cooling in a salt and ice bath Subsequently the combined mother liquids were evaporated under vacuum to a syrupy consistence and the residue dissolved in the smallest amount of hot 95 per cent alcohol The digitonin thus obtained was more highly colored than the products previously separated

The combined residues of the xylene-treated material in the capsules, after exhaustion with alcohol to remove the liberated digitonin weighed 94 Gm , apparently undecomposed digitonide This was again treated with xylene but again a residue of 40 Gm of apparently undecomposed digitonide resulted A third treatment still yielded a small residue which was set aside temporarily

The total amount of crystalline, sterol-precipitating material, *i e*, digitonin, thus obtained was about 155 Gm corresponding to 1 16 per cent of the seed It should be remembered, however, that a small amount of precipitated digitonide was not resolved into its components, also that some of the digitonin had been separated from the alcoholic extract as insoluble digitonide, having been formed during the process of extraction As yet it has not been ascertained whether the digitonide, removed as previously described, constitutes all of the digitonide formed during the extraction As previously pointed out it seems reasonable to assume that digitonide may be precipitated in the tissue during the process of extraction, hence may be lost in the marc

That the 155 Gm of material, separated as described, consisted of digitonin was demonstrated not only by its method of preparation which is sufficiently specific to exclude other compounds, but by its m p 227° to 240° (10) (not very conclusive it is true), its ability to precipitate sterols (quite conclusive), also by a positive Keller color reaction (11)

The defatted alcoholic concentrate from which the digitonin had been precipitated with cholesterol was set aside to be investigated at a later date, if deemed desirable

REFERENCES

(1) Windaus, *Z physiol Chem*, 65 (1910), 110
(2) Windaus, *Ber*, 42 (1909) 240
(3) Windaus, *Arch Pharm* 246 (1908) 123
(4) *Ibid*
(5) Ole Gisvold, JOUR A PH A, 23 (1934), 106
(6) Windaus u Hauth, *Ber*, 39 (1906), 4378
(7) *Am J Pharm*, 102 (1930), 545
(8) A E Rheineck and Ole Gisvold, *Science*, 78 (1933), 215
(9) The cholesterol used was obtained from human gall stones by extraction of the crushed gall stones with ether and subsequent crystallization from alcohol
(10) Van Rijn *Die Glykoside* (1931) 518
(11) Kiliani *Ber*, 24 (1891), 339

LABORATORY OF EDWARD KREMERS
MADISON, WIS

TWO SPECIES OF THE GENUS LEDUM *

BY RUSSELL A CAIN AND E V LYNN

Several years ago we reported (1) on the volatile oil of *Ledum grœnlandicum* Oeder, which grows abundantly in the numerous bogs of Washington We have now collected specimens of this plant from a dry bog near Seattle and examined them more carefully We have also gathered samples of *L columbianum* Piper, which is found along the coast of Oregon and Washington It is differentiated from *L glandulosum* by some and by others is considered identical It is distinguished from *L grœnlandicum* by being glabrous and by its larger, not revolute-margined leaves, which are not tomentose Like the other species it is reputed to be poisonous to stock, but no one has hitherto investigated it scientifically

* Scientific Section A PH A Madison meeting, 1933

A preliminary study having demonstrated that the composition is little influenced by the wetness of the soil in which the plants grow, the samples were collected at random They were thoroughly cleaned, allowed to dry in the air and then submitted to a proximate analysis, using the A O A C methods

	L grœnlandicum		*L columbianum*	
	Leaves	Flowers	Leaves	Flowers
Loss on air-drying	42 22	70 12	62 50	79 55
Loss at 100° C	6 16	7 53	6 55	8 11
Loss at 110° C	6 93	8 13	7 44	9 00
Ash	2 76	4 35	4 22	3 97
Ash, acid soluble	2 69	3 58	3 90	3 71
Selective Extraction				
Petroleum ether	5 48	3 36	6 61	2 98
Volatile	0 45	0 18	0 54	0 39
Ether	6 33	2 78	4 04	3 06
Volatile	0 24	0 28	0 53	0 41
Chloroform	1 78	1 12	1 40	1 24
Alcohol	34 12	38 39	28 16	31 19
Water	7 56	8 43	14 43	12 32

Alkaloid—Since the plants are considered poisonous to stock and because the leaves have been employed considerably in medicine and for killing insects, there was a possibility that an alkaloid is the responsible agent Accordingly 100 Gm each of the leaves and of the roots of both plants were separately exhausted with alcohol containing 1 per cent of tartaric acid The resulting solutions were concentrated under reduced pressure to a syrupy consistency, poured into water and filtered The filtrates were evaporated under reduced pressure to a small volume, made slightly alkaline with ammonia and extracted with 1 per cent sulphuric acid The acid solutions were treated separately with Wagner's, Marme's, Mayer's and Scheibler's reagents, with gold chloride, picric acid and tannic acid Since none of these materials gave any precipitate, we conclude that alkaloids are absent from the roots and leaves of these two species

VOLATILE OIL FROM L GRŒNLANDICUM

Immediately after being picked and separated from the stems, some of the leaves were transferred to a large still and subjected to distillation with steam From 362 pounds there was obtained a total of 226 cc, or 204 Gm of oil, representing a yield of approximately 0 12 per cent, 0 21 per cent on the dry basis By a previous maceration with water before distillation, this yield could be increased by about 50 per cent

The oil was light amber in color, possessed a characteristic odor and was neutral to litmus On standing it darkened somewhat and the odor became more pronounced The constants were d_{25} 0 9031, $[\alpha]_D^{20}$ +1 36°, n_D^{20} 1 4900, acid number 2 46, saponification number 28 81 (ester as bornyl acetate 9 32 per cent), after acetylization 97 20 (combined alcohol as borneol 7 24 per cent, free alcohol as borneol 11 57 per cent), methoxyl value 13 19 (Zeisel method) equivalent to 3 45 per cent of methyl eugenol

Free Acids—From 200 cc of the oil the free acids were extracted by means of five per cent sodium carbonate solution which was washed with ether to remove adhering oil and then evapo

rated to a small volume After acidification with sulphuric acid the residue was distilled and acetic acid identified in the distillate by characteristic reactions It is possible judging by odor, that there is also a small amount of butyric or valeric acid The total free acid amounted to about 2 5 per cent

Phenols —From the residual oil there was extracted by 5 per cent potassium hydroxide solution 0 49 Gm of phenols, or 0 27 per cent The index of refraction at 25° C was 1 5045 Carvacrol was identified by color reaction with ferric chloride, by the Fluckiger test and by the phenyl urethane melting at 135° C The total amount of phenols in the oil, as determined in a cassia flask was found to be 11 per cent Since carvacrol can be extracted from its alkaline solution, the total percentage in the oil may be much more than 0 27

Levo α phellandrene —The remaining oil was distilled repeatedly up to 105° C at 35 mm , giving a distillate of 36 5 cc which was found to be almost entirely α phellandrene It boiled at 170–175° C at atmospheric pressure had a specific gravity of 0 8628 at 20° C and a specific rotation in alcoholic solution of −10 45° at 20° C The nitrite when purified had a melting point of 113° C

Combined Acids —The rest of the oil was saponified with alcoholic potash and the alkaline solution was separated carefully and evaporated to a small volume This was then acidified and distilled and acetic acid was identified in the distillate as before Apparently there was also at least one more acid in the distillation residue, but it was in very small amount

The bulk of the oil after saponification was submitted to fractional distillation at 30–35 mm pressure and repeatedly refractionated The first 2 cc were found to be entirely α phel landrene

Levo borneol —At 140–142° C there was obtained a crystalline solid and a liquid, both of which gave identity tests for borneol The melting point of the crude solid was 203° C and a phenyl urethane could be obtained from either portion melting at 138° C The specific rotation of an alcoholic solution of the solid was found to be −37 64°, which indicated that the borneol is chiefly levo It is probably present in the oil, partly free and partly as acetate

Levo α caryophyllene —The third fraction, boiling at 145–170° C , was found to contain caryophyllene The blue nitrosochloride melted at 175° C , by rapid heating at 177° C , with decomposition The nitrosate melted at 166° C with decomposition which is somewhat higher than that usually given The specific rotation in alcoholic solution of this fraction was found to be −5 77°

Ledum Camphor —Although all attempts to freeze out this compound from the upper fractions failed, its presence was strongly indicated by the preparation of a phenyl urethane melting at 145° C Hjelt (2) gives this as 144–145° C There was also found a small amount of caryo phyllene in this same portion The presence of a ketone, such as was reported by Lomidse (3) in *Ledum palustre*, could not be established

The highest fraction was dark blue and probably contained azulene It gave a red solution in syrupy phosphoric acid and with hydrochloric acid in acetic acid solution a red color changing to violet The crystalline picrate was not obtained

OIL FROM THE FLOWERS

From the fresh flowers of *Ledum grœnlandicum* there was obtained by distillation with steam 0 058 per cent of oil, or 0 195 per cent on the dry basis This was mildly aromatic, of a red color and slightly acid to litmus The constants were d_{25} 1 0332, n_D^{20} 1 51025, acid number 28 03, ester number 77 97, after acetylization 161 31 These would indicate a much higher content of alcohols and esters than in the leaf oil

VOLATILE OIL FROM L COLUMBIANUM

From 397 pounds of fresh leaves, collected in June near North Bend, Oregon, there was obtained a total of 704 cc or 641 4 Gm , which represented a yield of 0 35 per cent, or 0 95 per cent on the dry basis Previous maceration with water before distillation increased this yield by 60 per cent

The oil was neutral to litmus, amber in color and possessed a mild odor similar to that from the leaves of *L grœnlandicum* The constants were d_{25} 0 9111, $[\alpha]_D^{25}$ +9 13°, n_D^{20} 1 4954, acid number 0 716, ester number 17 83 (6 24 per cent as bornyl acetate), after acetylization 79 56 (combined alcohol as borneol 4 90, free alcohol 12 07 per cent as borneol), methoxy value 10 73 (2 80 per cent as methyl eugenol)

Free Acids —From 200 cc of the oil the free acids were extracted by means of 5 per cent sodium carbonate solution as before Acetic acid was identified in the same way, its amount being less than 0 1 per cent There was also possibly a small amount of butyric or valeric acids

Phenols —Estimated volumetrically by a cassia flask, the amount of phenols was about 5 per cent, but by extraction with alkali and subsequent washing of the latter with ether only 0 15 per cent could be obtained This had an index of refraction of 1 5134 at 20° C Carvacrol was identified as before by color tests and by a phenyl urethane melting at 135° C

From the remaining oil the terpenes were separated by repeated distillation up to 100° C at 35 mm pressure The distillate, amounting to about 60 cc , was then carefully fractionated at ordinary pressure

Levo α pinene —In the first fraction, boiling point 155–162° C , d_{20} 0 8501, n_D^{20} 1 4700 $[\alpha]_D^{20}$ in alcoholic solution—27 04° a nitrosochloride was obtained which melted at 103° C Pinene was further identified by oxidation to pinonic acid whose semicarbazone melted at 204° C

Levo α pinene —The second fraction constituting over half of the terpenes, distilled at 162–170° C , d_{20} 0 8553, n_D^{20} 1 4750, $[\alpha]_D^{20}$ −16 85° in alcohol Oxidation by the method for β-pinene gave an acid melting at 95° C instead of 125° C Although none of the other terpenes could be identified, the presence of β pinene must remain in doubt

Dextro α phellandrene —The third fraction boiling at 170–175° C , d_{20} 0 8401 n_D^{20} 1 4772, $[\alpha]_D^{20}$ +26 68°, comprised about 10 per cent of the oil It consisted almost entirely of phel landrene, nitrite melting at 105° C

The remainder of the terpene fraction boiled at 175–185° C and was dextro Neither dipentene nor limonene could be identified

Combined Acids —The oil was saponified with alcoholic potash and the alkaline solution was separated and evaporated to a small volume After acidifying and distilling acetic acid was identified in the distillate There was probably a small amount of other acids judging by the odor and by the fact that ether extracted a few drops from the residue

Levo borneol —The rest of the oil was submitted to fractional distillation at 30–35 mm pressure and repeatedly refractionated The first portion was practically solid and consisted of borneol melting point 203° C , d_{20} 0 8972, n_D^{20} 1 4891, $[\alpha]_D^{20}$ in alcohol −33 59°, phenyl urethane melting at 138° C It amounted to about 15 per cent of the total oil

Levo α caryophyllene —The second fraction boiling point 170–185° C , d_{20} 0 9082, n_D^{20} 1 5054 $[\alpha]_D^{20}$ in alcohol −1 42°, was found to be caryophyllene The blue nitrosochloride melted at 177° C and the nitrosate at 166° C , both with decomposition The amount was about 10 per cent

Ledum Camphor —The third fraction, boiling point 195–200° C , d_{20} 0 9414, $[\alpha]_D^{20}$ +15 27°, n_D^{20} 1 5120 which made up 15 per cent of the oil gave copious quantities of a phenyl urethane melting at 145° C , which served to indicate ledum camphor All attempts to freeze out the material failed and at no time could solid ledol be obtained

As with the oil from *L grœnlandicum*, no semicarbazone could be obtained from any of these fractions, which would seem to indicate that the ketone of Lomidse (3) is not present

The highest fraction was dark blue probably because of the presence of azulene Although the characteristic color reactions were obtained as before, no crystalline derivative could be made

Columbenol —By subjecting the original oil to a temperature of −15° C for several hours there was obtained from it about 10 per cent of crystals which we were unable to identify with any known compound and have tentatively named columbenol The compound crystallized from alcohol and then from ligroin, was in the form of beautiful prismatic plates, varying somewhat in general appearance depending upon the solvent The constants found were melting

rated to a small volume After acidification with sulphuric acid the residue was distilled and acetic acid identified in the distillate by characteristic reactions It is possible judging by odor, that there is also a small amount of butyric or valeric acid The total free acid amounted to about 2 5 per cent

Phenols—From the residual oil there was extracted by 5 per cent potassium hydroxide solution 0 49 Gm of phenols, or 0 27 per cent The index of refraction at 25° C was 1 5045 Carvacrol was identified by color reaction with ferric chloride by the Flückiger test and by the phenyl urethane melting at 135° C The total amount of phenols in the oil as determined in a cassia flask, was found to be 11 per cent Since carvacrol can be extracted from its alkaline solution the total percentage in the oil may be much more than 0 27

Levo α phellandrene—The remaining oil was distilled repeatedly up to 105° C at 35 mm, giving a distillate of 36 5 cc which was found to be almost entirely α phellandrene It boiled at 170–175° C at atmospheric pressure had a specific gravity of 0 8628 at 20° C and a specific rotation in alcoholic solution of −10 45° at 20° C The nitrite when purified had a melting point of 113° C

Combined Acids—The rest of the oil was saponified with alcoholic potash and the alkaline solution was separated carefully and evaporated to a small volume This was then acidified and distilled and acetic acid was identified in the distillate as before Apparently there was also at least one more acid in the distillation residue but it was in very small amount

The bulk of the oil after saponification was submitted to fractional distillation at 30–35 mm pressure and repeatedly refractionated The first 2 cc were found to be entirely α phel landrene

Levo borneol—At 140–142° C there was obtained a crystalline solid and a liquid both of which gave identity tests for borneol The melting point of the crude solid was 203° C and a phenyl urethane could be obtained from either portion melting at 138° C The specific rotation of an alcoholic solution of the solid was found to be −37 64°, which indicated that the borneol is chiefly levo It is probably present in the oil partly free and partly as acetate

Levo α caryophyllene—The third fraction, boiling at 145–170° C, was found to contain caryophyllene The blue nitrosochloride melted at 175° C by rapid heating at 177° C with decomposition The nitrosate melted at 166° C with decomposition which is somewhat higher than that usually given The specific rotation in alcoholic solution of this fraction was found to be −5 77°

Ledum Camphor—Although all attempts to freeze out this compound from the upper fractions failed its presence was strongly indicated by the preparation of a phenyl urethane melting at 145° C Hjelt (2) gives this as 144–145° C There was also found a small amount of caryo phyllene in this same portion The presence of a ketone such as was reported by Lomidse (3) in *Ledum palustre*, could not be established

The highest fraction was dark blue and probably contained azulene It gave a red solution in syrupy phosphoric acid and with hydrochloric acid in acetic acid solution a red color changing to violet The crystalline picrate was not obtained

OIL FROM THE FLOWERS

From the fresh flowers of *Ledum grœnlandicum* there was obtained by distillation with steam 0 058 per cent of oil, or 0 195 per cent on the dry basis This was mildly aromatic, of a red color and slightly acid to litmus The constants were d_{25} 1 0332, n_D^{20} 1 51025, acid number 28 03, ester number 77 97, after acetylization 161 31 These would indicate a much higher content of alcohols and esters than in the leaf oil

VOLATILE OIL FROM L COLUMBIANUM

From 397 pounds of fresh leaves, collected in June near North Bend, Oregon, there was obtained a total of 704 cc or 641 4 Gm, which represented a yield of 0 35 per cent, or 0 95 per cent on the dry basis Previous maceration with water before distillation increased this yield by 60 per cent

The oil was neutral to litmus, amber in color and possessed a mild odor similar to that from the leaves of *L grœnlandicum* The constants were d_{25} 0 9111, $[\alpha]_D^{25}$ +9 13°, n_D^{20} 1 4954, acid number 0 716, ester number 17 83 (6 24 per cent as bornyl acetate), after acetylization 79 56 (combined alcohol as borneol 4 90, free alcohol 12 07 per cent as borneol), methoxy value 10 73 (2 80 per cent as methyl eugenol)

Free Acids—From 200 cc of the oil the free acids were extracted by means of 5 per cent sodium carbonate solution as before Acetic acid was identified in the same way, its amount being less than 0 1 per cent There was also possibly a small amount of butyric or valeric acids

Phenols—Estimated volumetrically by a cassia flask the amount of phenols was about 5 per cent, but by extraction with alkali and subsequent washing of the latter with ether only 0 15 per cent could be obtained This had an index of refraction of 1 5134 at 20° C Carvacrol was identified as before by color tests and by a phenyl urethane melting at 135° C

From the remaining oil the terpenes were separated by repeated distillation up to 100° C at 35 mm pressure The distillate amounting to about 60 cc was then carefully fractionated at ordinary pressure

Levo α pinene—In the first fraction, boiling point 155–162° C, d_0 0 8501, n_D^{20} 1 4700, $[\alpha]_D^{20}$ in alcoholic solution—27 04°, a nitrosochloride was obtained which melted at 103° C Pinene was further identified by oxidation to pinonic acid whose semicarbazone melted at 204° C

Levo α pinene—The second fraction, constituting over half of the terpenes distilled at 162–170° C, d_{20} 0 8553, n_D^{20} 1 4750, $[\alpha]_D^{20}$ −16 85° in alcohol Oxidation by the method for β pinene gave an acid melting at 95° C instead of 125° C Although none of the other terpenes could be identified, the presence of β pinene must remain in doubt

Dextro α phellandrene—The third fraction boiling at 170–175° C, d_0 0 8401 n_D^{20} 1 4772, $[\alpha]_D^{20}$ +26 68°, comprised about 10 per cent of the oil It consisted almost entirely of phellandrene, nitrite melting at 105° C

The remainder of the terpene fraction boiled at 175–185° C and was dextro Neither dipentene nor limonene could be identified

Combined Acids—The oil was saponified with alcoholic potash and the alkaline solution was separated and evaporated to a small volume After acidifying and distilling, acetic acid was identified in the distillate There was probably a small amount of other acids judging by the odor and by the fact that ether extracted a few drops from the residue

Levo borneol—The rest of the oil was submitted to fractional distillation at 30–35 mm pressure and repeatedly refractionated The first portion was practically solid and consisted of borneol, melting point 203° C, d_{20} 0 8972, n_D^{20} 1 4891, $[\alpha]_D^{20}$ in alcohol −33 59°, phenyl urethane melting at 138° C It amounted to about 15 per cent of the total oil

Levo α caryophyllene—The second fraction boiling point 170–185° C d_0 0 9082, n_D^{20} 1 5054, $[\alpha]_D^{20}$ in alcohol −1 42°, was found to be caryophyllene The blue nitrosochloride melted at 177° C and the nitrosate at 166° C, both with decomposition The amount was about 10 per cent

Ledum Camphor—The third fraction, boiling point 195–200° C, d_0 0 9414, $[\alpha]_D^{20}$ +15 27° n_D^{20} 1 5120 which made up 15 per cent of the oil, gave copious quantities of a phenyl urethane melting at 145° C, which served to indicate ledum camphor All attempts to freeze out the material failed and at no time could solid ledol be obtained

As with the oil from *L grœnlandicum*, no semicarbazone could be obtained from any of these fractions which would seem to indicate that the ketone of Lomidse (3) is not present

The highest fraction was dark blue probably because of the presence of azulene Although the characteristic color reactions were obtained as before, no crystalline derivative could be made

Columbenol—By subjecting the original oil to a temperature of −15° C for several hours, there was obtained from it about 10 per cent of crystals which we were unable to identify with any known compound and have tentatively named columbenol The compound, crystallized from alcohol and then from ligroin, was in the form of beautiful prismatic plates varying somewhat in general appearance depending upon the solvent The constants found were melting

point 55 7° C boiling point with some decomposition 277° C , $n_D^{58.5}$ 1 5169, n_D^{62} 1 5155, $[\alpha]_D$ in 1 per cent alcoholic solution +5 2°, *molecular refraction at 20° C about 73* Analysis gave Carbon 82 45, 82 70 82 55 82 46, hydrogen 10 55, 10 04, 10 17, 10 13 per cent Calculated for $C_{15}H_{26}O$ requires 82 53 and 10 32 per cent

Columbenol is colorless, odorless and bland in taste, is neutral to litmus, freely soluble in all of the usual solvents except water or dilute alcohol It dissolves in sulphuric acid to a red brown color and in nitric acid to a light brown, both turning gradually darker A mixture of the two acids gives a violent reaction, finally resulting in an almost black solution Addition of sulphuric acid to a chloroformic solution gives a deep red color which slowly changes to purple No chemical derivatives could be prepared, such as phenyl urethane semicarbazone, oxime benzoate, etc Bromine was not decolorized in ether solution notwithstanding that the molecular, refraction indicated an unsaturated compound It is, therefore, impossible to classify columbenol but since dehydration seemed to form a hydrocarbon, we have assumed that it is a tertiary alcohol of the sesquiterpene series

OIL FROM THE FLOWERS

From the fresh flowers of *L columbianum* was obtained 0 59 per cent of oil or 2 87 per cent on the dry basis It was neutral, light amber and strongly aromatic, d_{20} 1 0182, $[\alpha]_D^{20}$ in alcohol −8 41°, n_D^{20} 1 5119, acid number 7 27, ester number 23 61 (as bornyl acetate 8 26 per cent), after acetylization 128 65 (combined alcohol 6 49, free alcohol 28 89 per cent as borneol) By freezing, columbenol could be separated from the oil in about the same proportion as in that from the leaf

ARBUTIN

This glucoside is reported to be present in some species of *Ledum*, including *L grœnlandicum* (4), but we have been unable to find any record of its isolation Uloth obtained hydroquinone by dry distillation, but most of the evidence seems to be based upon color reactions using an aqueous solution

We have extracted the leaves of both our own species with water in the usual way in order to determine if arbutin is present After precipitation with neutral and basic lead acetate and removal of the excess lead, the solution was evaporated under reduced pressure to a small volume Since nothing separated even after some time, the syrupy residue was extracted with spirit of ether and the solvent was evaporated The addition of ferric chloride to an aqueous solution of the residue gave a dark blue color, while phosphomolybdic acid produced an intense blue in an ammoniacal solution (Jungmann's test) Since these are typical of arbutin, we admit the possibility of its presence, but could not prepare hydroquinone, quinhydrone or quinone from the aqueous residue In any event the amount must be small because it would otherwise have separated from the evaporated solution Extraction of uva-ursi in a similar manner gave crystals of arbutin which responded to the above color reactions and yielded readily hydroquinone and its oxidation products

ERICOLIN

Throughout the literature are numerous references to a glucoside, ericolin, and to its occurrence in several plants, chiefly ericaceous It was first separated by Rochleder and Schwarz (5) from the leaves of *Ledum palustre* L as a brownish yellow resin with an intensely bitter taste Upon hydrolysis they obtained a volatile oil which Willigk (6) assumed to have the same composition as the oil obtained

directly by distillation with steam Although others have claimed that about thirty other plants contain ericolin, including *Ledum grœnlandicum*, we can find no reference to actual separation and purification of a glucoside The only evidence is based upon the oily hydrolytic product, which was given (7) the formula $C_{20}H_{26}O$

In order to learn more about this substance, we have worked with the aqueous extract as obtained under arbutin, using the leaves of each of our own species The syrupy residue was extracted by a mixture of alcohol and ether and the resulting solution was dried and evaporated The residue was made acid with sulphuric acid and distilled with steam, giving a product which had a strong odor typical of the higher fractions previously described Extraction with ether yielded an amber-colored oil in small amount, n_D^{20} 1 5213 for *L grœnlandicum*, 1 5130 for *L columbianum* In each case there could be prepared from this oil a phenyl urethane melting at 145° C We conclude from these results that the leaves of both species contain a glucoside which hydrolyzes to give ledum camphor or a similar substance If this glucoside be the unknown ericolin, which could not be isolated in the pure state, the formula given above for the hydrolytic product may not be right

TOXICITY

Emulsions of the two oils were separately fed to adult white rats in increasing doses up to 1 44 Gm per Kg weight Except for some slight irritation during administration, the oils gave no outward physiological effects

The powdered leaves of each species were rolled with glucose into pills and fed to a rabbit in doses up to 10 Gm of the leaves per Kg weight Again no observable effects were noted

Finally adult white rats were fed equivalent doses of columbenol, with similar negative results

We can safely conclude that the leaves and oils of our two species are certainly not poisonous under the conditions here, because the doses used were extraordinarily high

SUMMARY

After a partial analysis of the leaves of *Ledum grœnlandicum* and of *L columbianum*, during which alkaloids were found absent, the volatile oils were more carefully examined

Fresh leaves of the former yielded 0 12 to 0 18 per cent of oil containing 20 per cent of l-borneol, partly as acetate, 15 per cent each of l-α-phellandrene, l-α caryophyllene and ledum camphor, a smaller quantity of phenols, chiefly carvacrol, some free acetic and probably other acids, probably some azulene The fresh flowers gave 0 058 per cent of oil with much different constants

Fresh leaves of the other species yielded 0 35 to 0 56 per cent of oil containing 3 per cent of l-α-pinene, 17 per cent of l-borneol, partly as acetate, 15 per cent each of ledum camphor and an unidentified terpene, probably l-β-pinene, 10 per cent each of d-α-phellandrene, l-α-caryophyllene and columbenol, a stearoptene, probably $C_{15}H_{22}O$, a small amount of phenols, chiefly carvacrol, some free acetic and other acids, probably some azulene The fresh flowers gave 0 59 per cent of oil with quite different constants and containing about 10 per cent of columbenol

Contrary to previous reputation, they were found not poisonous to rats or rabbits, even when given in enormous doses

No evidence could be found for the presence of arbutin which had been claimed as a constituent of *L grœnlandicum* The glucoside ericolin may be in the leaves of both species, as attested by hydrolysis to an oil probably containing ledum camphor However, since no one has ever isolated this glucoside in the pure state from any vegetable source, we have doubts as to the uniformity of its composition

REFERENCES

(1) Lynn Lehman and Cain, THIS JOURNAL 25 (1926), 263
(2) Hjelt *Ber* 28 (1895) 3087
(3) Lomidse, PROC A PH A , 52 (1904) 669
(4) Uloth *Ann* 3 (1859), 215
(5) Rochleder and Schwarz *Ibid* , 83 (1852) 363
(6) Willigk, *Ibid* 83, (1852) 366
(7) Thal PROC A PH A 32 (1884), 146

SEATTLE WASH
June 20 1933

DETERMINATION OF CERTAIN MEDICAMENTS UNDER THE INFLUENCE OF LIGHT *

BY H V ARNY, A TAUB AND R H BLYTHE

I —INTRODUCTION

This report covers the third and fourth years of research on the deterioration of chemicals and pharmaceuticals when stored in colored glass containers A complete report of the work of the years 1929–1931 conducted by Dr Abraham Steinberg under the personal direction of Professor Abraham Taub and the senior author was presented by Dr Steinberg as an "Arbeit" submitted in partial fulfilment of the requirements set for the degree of Doctor of Pharmacy of Columbia University, while the material in condensed form was published as a paper by Arny, Taub and Steinberg in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 20 (1931), 1014 and 1153

During 1931–1932, a second fund of $2000 was raised to continue the work where it was discontinued by Dr Steinberg The second fund of $2000 was obtained through the generosity of the following firms and organizations

Subscriptions of $100 each from Burroughs Wellcome & Co , London and New York, Dow Chemical Co Midland Michigan Hynson Westcott and Dunning Baltimore Md , Lehn & Fink Bloomfield N J and New York City, Merck & Co Rahway N J and New York City, Charles Pfizer & Co Brooklyn and New York City Smith Kline & French Laboratories Philadelphia Pa E R Squibb & Sons Brooklyn and New York City, the Upjohn Co Kalamazoo Mich and the Proprietary Association

A subscription of $200 from William R Warner & Co , Inc , New York

A grant of $300 from the Breitenbach Fund of the College of Pharmacy of the City of New York A grant of $500 from the Board of Trustees of the U S Pharmacopœial Convention

As research fellow for 1932–1934, the senior author selected Rudolph H Blythe, B S , who gave the subject his devoted attention during two years as a stu-

* Joint Session Scientific Section and Section on Practical Pharmacy and Dispensing Washington meeting 1934

dent of the graduate course of the College of Pharmacy of Columbia University His efforts won the degree of Doctor of Pharmacy of Columbia in June 1934, and in fulfilling the requirements set for the degree, Dr Blythe submitted an inaugural dissertation of 168 typewritten pages The present paper represents a condensation of the Blythe "Arbeit"

In connection with the research, the following firms donated bottles, chemicals and pharmaceuticals

Charles Cooper & Co Corning Glass Works, Dodge & Olcott Co, Fritzsche Bros, Inc, Heine & Co, Eli Lilly & Co, Mallinckrodt Chemical Works, Maryland Glass Corporation, Merck & Co, Monsanto Chemical Works, New York Quinine and Chemical Works, Owens Illinois Glass Co, Charles Pfizer & Co, Schieffelin & Co Sharp & Dohme, Smith, Kline & French Laboratories, E R Squibb & Sons and W R Warner & Co

To these firms we are very grateful

II —PHYSICAL MEASUREMENTS

(A Taub and R H Blythe)

As in the case of the Steinberg research of 1929–1931 each type of bottle used was submitted to spectrophotometric readings by means of the Bausch and Lomb apparatus of the physics laboratory of the College of Pharmacy This instrument gave measurements from 400–800 mμ For transmission values in the ultraviolet region, we employed a Hilger quartz spectrograph, kindly placed at our disposal by the Department of Physics of Columbia University Our readings gave practically the same values as reported on the graphs shown in the Steinberg paper of 1931 This is not surprising since the bottles employed were furnished by the same firms who contributed their glassware for the 1929–1931 investigation While there has been during the past two years considerable talk about new types of glass bottles, numerous requests on our part failed to bring us practical samples of new types The six types of bottles used by us represent the average run of the bottle market of to-day, as applied to the drug trade

III —DETERIORATION OF CHEMICALS AND PHARMACEUTICALS

(H V Arny and R H Blythe)

The procedure in the 1932–1934 investigation was identical with that described in the Steinberg paper of 1931 All chemicals studied were subjected to a complete physical and chemical examination as prescribed by the U S P or the N F and all pharmaceuticals were either prepared by Mr Blythe or were tested by him as per standards set by the Pharmacopœia or the Formulary In all but a few special cases, the observed substance was placed in a pyrex tube which in turn was placed in a colored container that was being studied The medicaments were then observed under the following conditions

(1) 15 liquids and 13 solids (all of U S P or N F strength and quality when prepared or received) were stored in pyrex test tubes (or ampuls) and these tubes placed into commercial glass containers (2 flint, 2 amber, 1 blue and 1 green) Five sets of these specimen chemicals (1300 samples in all) were exposed to light on the roof of our College building, in cases protected by a single sheet of window glass

(2) One set of specimens (225 samples in all) was exposed in diffused light in cases in the office of the senior author
(3) One set (170 samples in all) was kept in a closet in our dark room
(4) Of the five sets on the roof, one was brought in after one month's exposure and studied The second set was examined after two months' exposure The third, fourth and fifth sets were examined after exposures representing 4, 6 and 12 months, respectively

As to our results, we submit three tables of comparison, two based upon exposure to light during one year Results obtained after exposure for 1, 2, 4 and 6 months will be found in the original Blythe "Arbeit" As to these tables, the first discusses, in general terms, the effect of direct light, diffused light and darkness upon the chemicals examined The second table gives degree of deterioration when the chemicals were exposed in diffused (day) light for one year, while the third table shows time limit of stability when exposed to direct (sun) light The first 10 chemicals in Table II were assayable, hence the change can be expressed mathematically The others on the list were judged by the degree of color change or by special types of qualitative tests

Table I —General Findings as to Deterioration

Exposure for 1 Year

Stable in All Types of Glass Containers under All Conditions	Stable in All Conditions of Diffused Light	Unstable in Light Stable in Dark
*Ferrous carbonate, saccharated	Acetyltannic acid	Aloin
Solution of picric acid (1%)	Chloramine	*Quinidine sulphate
	Dichloramine	*Quinine
Unstable in All Conditions of Light and Darkness	Gallic acid	*Quinine sulphate
*Elixir of glycerophosphates, compound	Liquid petrolatum	
*Elixir of iron, quinine and strychnine	*Solution of ferric chloride	
*Nitric acid	*Solution of formaldehyde	
*Compound solution of iodine	Strontium salicylate	
*Oil of bitter almond	Tannic acid	
*Syrup U S P		
Compound syrup of hypophosphites		

* See special notes following tables

Table II —Degree of Deterioration in Glass Containers after One Year of Exposure in Diffused Light

Group A

Percentage of Deterioration Shown by Actual Assay

	Amber A	Amber B	Blue.	Green	Flint A.	Flint B
Chloramine	0%	0%	0 7%	0 7%	0 7%	0 7%
Dichloramine	1 2%	0%	3 7%	0 8%	2 1%	2 8%
Ferrous carbonate saccharated	9 1%	8 4%	8 4%	8 4%	0 6%	0 7%
*Nitric acid	21 5%	17 2%	16 9%	14 2%	11 5%	16 9%
Oil of bitter almond	11 0%	11 4%	12 8%	10 8%	10 1%	
*Solution of ferric chloride	1 4%	1 5%	1 5%	1 6%	1 9%	0 6%
*Solution of formaldehyde	0 3%	G	G	0 4%	0%	0 4%
Solution of iodine compound	50%	46%	46%	63%	60%	

Solution of picric acid (1%)	0%	0%	0%	0%	0%	0%
*Syrup U S P	15%	13%	6%	7%	22%	

* See special notes following tables

Group B

Deterioration Shown by Color Change or by Special Tests

Abbreviations

C D —considerable darkening S D —slight darkening V S D —very slight darkening
N C —no change

	Amber A	Amber B	Blue	Green	Flint A	Flint B
Acetyltannic acid	N C	N C	N C	N C	N C	N C
Aloin	N C	N C	V S D	V S D	V S D	V S D
Elixir of glycerophosphates, compound	S D	V S D	V S D	S D	S D	S D
Elixir of iron, quinine and strychnine	S D	S D	C D	C D	C D	C D
*Ferrous carbonate saccharated	V S D	V S D	V S D	V S D	V S D	V S D
Gallic acid	N C	N C	N C	N C	N C	N C
Oil of bitter almond	S D	V S D	V S D	V S D	V S D	
Quinidine sulphate	N C	N C	V S D	V S D	V S D	V S D
Quinine	N C	N C	V S D	V S D	V S D	V S D
Quinine sulphate	N C	N C	V S D	V S D	V S D	V S D
Strontium salicylate	N C	N C	N C	N C	N C	N C
Syrup of hypophosphites compound	S D	S D	S D	S D	S D	S D
Tannic acid	V S D	V S D	V S D	V S D	V S D	V S D

* See special notes following tables

TABLE III —SPEED OF DETERIORATION IN GLASS CONTAINERS EXPOSED IN DIRECT (SUN) LIGHT

(Expressed in Months)

Abbreviation "—1" means less than 1 month

	Amber A	Amber B	Blue	Green	Flint A	Flint B
Acetyltannic acid	4	4	4	4	4	4
Aloin	—1	—1	—1	—1	—1	—1
Chloramine	2	2	—1	1	1	1
Dichloramine	2	2	—1	—1	—1	—1
*Elixir of glycerophosphates, compound	1	1	—1	—1	—1	—1
Elixir of iron, quinine and strychnine	1	1	—1	—1	—1	—1
Ferrous carbonate, saccharated	12	12	12	12	12	12
Gallic acid	12	12	1	1	1	1
Liquid petrolatum	6	6	2	2	2	2
Nitric acid	2	2	1	1	1	1
*Oil of bitter almond	12	12	—1	—1	—1	—1
*Quinidine sulphate	2	2	—1	—1	—1	—1
Quinine	2	2	—1	—1	—1	—1
Quinine sulphate	2	2	—1	—1	—1	—1
*Solution of ferric chloride	2	2	1	1	1	1
*Solution of formaldehyde	6	12	6	6	12	12
*Solution of iodine, compound	—1	—1	—1	—1	—1	—1
Solution of picric acid (1%)	12	12	12	12	12	12
Strontium salicylate	6	6	2	2	2	2
*Syrup U S P	4	4	2	2	2	2
Syrup of hypophosphites, compound	1	1	1	1	1	1
Tannic acid	2	2	1	1	1	1

* See special notes following tables

(2) One set of specimens (225 samples in all) was exposed in diffused light in cases in the office of the senior author
(3) One set (170 samples in all) was kept in a closet in our dark room
(4) Of the five sets on the roof, one was brought in after one month's exposure and studied The second set was examined after two months' exposure The third, fourth and fifth sets were examined after exposures representing 4, 6 and 12 months, respectively

As to our results, we submit three tables of comparison, two based upon exposure to light during one year Results obtained after exposure for 1, 2, 4 and 6 months will be found in the original Blythe "Arbeit" As to these tables, the first discusses, in general terms, the effect of direct light, diffused light and darkness upon the chemicals examined The second table gives degree of deterioration when the chemicals were exposed in diffused (day) light for one year, while the third table shows time limit of stability when exposed to direct (sun) light The first 10 chemicals in Table II were assayable, hence the change can be expressed mathematically The others on the list were judged by the degree of color change or by special types of qualitative tests

TABLE I —GENERAL FINDINGS AS TO DETERIORATION

Exposure for 1 Year

Stable in All Types of Glass Containers under All Conditions	Stable in All Conditions of Diffused Light	Unstable in Light Stable in Dark
*Ferrous carbonate, saccharated	Acetyltannic acid	Aloin
Solution of picric acid (1%)	Chloramine	*Quinidine sulphate
	Dichloramine	*Quinine
Unstable in All Conditions of Light and Darkness	Gallic acid	*Quinine sulphate
	Liquid petrolatum	
*Elixir of glycerophosphates compound	*Solution of ferric chloride	
*Elixir of iron quinine and strychnine	*Solution of formaldehyde	
*Nitric acid	Strontium salicylate	
*Compound solution of iodine	Tannic acid	
*Oil of bitter almond		
*Syrup U S P		
Compound syrup of hypophosphites		

* See special notes following tables

TABLE II —DEGREE OF DETERIORATION IN GLASS CONTAINERS AFTER ONE YEAR OF EXPOSURE IN DIFFUSED LIGHT

Group A

Percentage of Deterioration Shown by Actual Assay

	Amber A	Amber B	Blue	Green	Flint A	Flint B
Chloramine	0%	0%	0 7%	0 7%	0 7%	0 7%
Dichloramine	1 2%	0%	3 7%	0 8%	2 1%	2 8%
Ferrous carbonate saccharated	9 1%	8 4%	8 4%	8 4%	0 6%	0 7%
*Nitric acid	21 5%	17 2%	16 9%	14 2%	11 5%	16 9%
Oil of bitter almond	11 0%	11 4%	12 8%	10 8%	10 1%	
*Solution of ferric chloride	1 4%	1 5%	1 5%	1 6%	1 9%	0 6%
*Solution of formaldehyde	0 3%	G	G	0 4%	0%	0 4%
Solution of iodine compound	50%	46%	46%	63%	60%	

Solution of picric acid (1%)	0%	0%	0%	0%	0%	0%
*Syrup U S P	15%	13%	6%	7%	22%	

* See special notes following tables

Group B

Deterioration Shown by Color Change or by Special Tests

Abbreviations

C D —considerable darkening S D —slight darkening V S D —very slight darkening
N C —no change

	Amber A	Amber B	Blue	Green	Flint A	Flint B
Acetyltannic acid	N C	N C	N C	N C	N C	N C
Aloin	N C	N C	V S D	V S D	V S D	V S D
Elixir of glycerophosphates, compound	S D	V S D	V S D	S D	S D	S D
Elixir of iron, quinine and strychnine	S D	S D	C D	C D	C D	C D
*Ferrous carbonate saccharated	V S D	V S D	V S D	V S D	V S D	V S D
Gallic acid	N C	N C	N C	N C	N C	N C
Oil of bitter almond	S D	V S D	V S D	V S D	V S D	
Quinidine sulphate	N C	N C	V S D	V S D	V S D	V S D
Quinine	N C	N C	V S D	V S D	V S D	V S D
Quinine sulphate	N C	N C	V S D	V S D	V S D	V S D
Strontium salicylate	N C	N C	N C	N C	N C	N C
Syrup of hypophosphites, compound	S D	S D	S D	S D	S D	S D
Tannic acid	V S D	V S D	V S D	V S D	V S D	V S D

* See special notes following tables

TABLE III —SPEED OF DETERIORATION IN GLASS CONTAINERS EXPOSED IN DIRECT (SUN) LIGHT

(Expressed in Months)

Abbreviation '—1" means less than 1 month

	Amber A	Amber B	Blue	Green	Flint A	Flint B
Acetyltannic acid	4	4	4	4	4	4
Aloin	—1	—1	—1	—1	—1	—1
Chloramine	2	2	—1	1	1	1
Dichloramine	2	2	—1	—1	—1	—1
*Elixir of glycerophosphates, compound	1	1	—1	—1	—1	—1
Elixir of iron, quinine and strychnine	1	1	—1	—1	—1	—1
Ferrous carbonate, saccharated	12	12	12	12	12	12
Gallic acid	12	12	1	1	1	1
Liquid petrolatum	6	6	2	2	2	2
Nitric acid	2	2	1	1	1	1
*Oil of bitter almond	12	12	—1	—1	—1	—1
*Quinidine sulphate	2	2	—1	—1	—1	—1
Quinine	2	2	—1	—1	—1	—1
Quinine sulphate	2	2	—1	—1	—1	—1
*Solution of ferric chloride	2	2	1	1	1	1
*Solution of formaldehyde	6	12	6	6	12	12
*Solution of iodine compound	—1	—1	—1	—1	—1	—1
Solution of picric acid (1%)	12	12	12	12	12	12
Strontium salicylate	6	6	2	2	2	2
*Syrup U S P	4	4	2	2	2	2
Syrup of hypophosphites compound	1	1	1	1	1	1
Tannic acid	2	2	1	1	1	1

* See special notes following tables

IV —PECULIARITIES OF CERTAIN CHEMICALS

Elixir of Glycerophosphates, Compound —This preparation darkens in diffused light and deposits a precipitate in sunlight It even darkens when kept in a dark place Amber glass is the best protective

Elixir of Iron, Quinine and Strychnine is another pharmaceutical that readily deteriorates This deterioration appears to be essentially a photochemical change, the preparation being especially susceptible to rays below 4800 Å The ferric salt appears to act as a sensitizer and is itself affected by the light rays As reported by Fry and Gerwe some years ago, the citric acid of the citrate is partially broken down to carbon dioxide and acetone, while some of the ferric ions are reduced to the ferrous form This preparation should be submitted to long and intensive study

Ferrous Carbonate, Saccharated —This preparation is one which sunlight improves Our ferrous assays indicate the greatest deterioration after storing in the dark and the least in the sunlight In diffused light, flint glass is a better protective than amber glass When stored in loosely stoppered bottles, the reducing action of light seems counteracted by the oxidizing action of the air

Fluidextract of Ergot —In the original plan the deterioration studies of this fluidextract and also tinctures of aconite and digitalis were started Lacking facilities for pharmacologic assaying and failing to find what were to us, satisfactory colorimetric tests, work on these three pharmaceuticals was postponed

Nitric Acid —The erratic results obtained in the study of this chemical were largely due to evaporation In all cases of exposure to light, the acid suffered serious loss in strength Color of glass container had apparently little influence except that amber was the best protective Sample stored in the dark in its original glass-stoppered container for one year lost only 1 per cent of HNO_3

Oil of Bitter Almond was studied from its change in color, from its loss of benzaldehyde and from its deposition of benzoic acid crystals Decrease in benzaldehyde occurred even in the dark, being about 9 per cent loss within 1 year Direct sunlight produces as much as 50 per cent deterioration except when the oil is stored in amber bottles

Quinidine Sulphate, Quinine and *Quinine Sulphate* are uniformly stable when stored in the dark In the light, amber glass affords the best protection

Solution of Ferric Chloride keeps fairly well in diffused light, almost as well as when stored in the dark In sunlight, ferrous iron begins to appear within one or two months

Solution of Formaldehyde —In diffused light, this solution suffers little or no loss in strength In fact, as shown in Table II, Group A, two samples (those indicated by the letter "G") actually gained a fraction of 1 per cent in strength, due undoubtedly to evaporation of the solvent

Solution of Iodine, Compound —When stored in containers provided with cork or rubber stoppers, deterioration proceeded rapidly whether stored in light or dark On the other hand, a sample stored in the dark in a glass-stoppered bottle during one year showed only little or no deterioration Likewise a sample sealed in an ampul and exposed to sunlight for 4 months suffered no loss in strength

Syrup U S P —Our experiments were based upon degree of inversion Those

samples exposed to sunlight showed inversion within 4 months Samples stored in the dark for one year, indicated over 10 per cent inversion The sample exposed to diffused light for one year in the second type of flint bottle gave such a discrepant figure that it is omitted from the table

Syrup of Hypophosphites, Compound —The color of this preparation darkens even when stored in the dark The darkening is greater in sunlight than in diffused light The deterioration is evidently an oxidation phenomenon In sunlight, precipitation occurs, while in diffused light and in the dark, the darkening of the color is the only indication of change Color of glass container has evidently little or no influence

Tincture of Aconite and *Tincture of Digitalis* —See Fluidextract of Ergot

Lard, Expressed Oil of Almond and *Ointment of Rose Water, U S P* were studied from the standpoint of rancidity While no authoritative statements may be made by us concerning this annoying phenomenon we venture to express the following opinions

(*a*) Rancidity progresses in the dark as well as in the light
(*b*) In actual practice, the color of the glass container seems of little importance
(*c*) Oxygen (of the air) and moisture are essential factors in producing rancidity Light acts as an accelerator but is not an essential factor in the reaction

V —BIBLIOGRAPHY

Dr Blythe's dissertation includes a bibliography of 162 titles Limitations of space prevent its inclusion in this paper

VI —CONCLUSIONS

(1) Amber glass affords the most protection of any glass now commercially available

(2) Red and green Corning filters, used as described in our paper of 1931, offer the greatest protection of any glass tried These are not, however, available as commercial glass containers

(3) The ordinary easily available green glass containers are not, however, as good protectives for medicaments as is amber glass

(4) The following tables summarize the Steinberg and the Blythe studies of the deterioration of 50 medicaments classified as to causes of deterioration (*a*) light, (*b*) simple volatilization, (*c*) chemical changes produced by factors other than light In the first table "A" indicates that amber glass was the best protective, while "G" means that green glass also acted as protective

(A) Deterioration Due to Light

Acetyltannic acid	A	Hydriodic acid syrup	
Adrenalin hydrochloride	A	Hydrobromic acid	
Aloin	A	Liquid petrolatum	A
Benzoic acid	A	Mercuric oxide, red	
Betanaphthol	A & G	Mercuric oxide, yellow	
Chloroform	A & G	Mercurous chloride	A & G

Chloramine	A
Dichloramine	A
Ephedrine hydrochloride	
Ether	A & G
Ferric chloride solution	
Ferric citrate	
Ferric phosphate soluble	A
Ferric pyrophosphate soluble	A & G
Formaldehyde solution	
Gallic acid	A
Hydriodic acid	
Mercurous iodide	
Pyrogallol	A & G
Quinidine sulphate	A
Quinine	A
Quinine sulphate	A
Resorcinol	A & G
Santonin	A & G
Strontium salicylate	A & G
Tannic acid	A
Thymol iodide	A & G

(B) To Volatilization

Hydrocyanic acid diluted
Nitric acid
Solution of chlorinated soda
Solution of chlorine, compound
Solution of iodine, compound
Spirit of ethyl nitrite

(C) To Chemical Changes Produced by Factors Other Than Light

Apomorphine hydrochloride
Elixir of glycerophosphates, compound
Elixir of iron, quinine and strychnine
Oil of bitter almond
Physostigmine salicylate
Silver nitrate
Solution of arsenous and mercuric iodide
Solution of hydrogen dioxide
Sulphurated potassa
Syrup U S P
Syrup of hypophosphites, compound

(D) Stable to Light

Ferrous carbonate saccharated[1]
Ferrous iodide, syrup[1]
Mercuric iodide, red
Liquefied phenol
Picric acid solution (1%)[2]
Silver proteins (mild and strong)

VII —UNSOLVED PROBLEMS

A research of the character just described usually brings in its trail a series of questions more puzzling than the original investigation We have studied the 50 medicaments as summarized above and we find that among these 33 cases of deterioration due to light, 6 due to volatilization and 11 due to chemical changes produced by factors other than light These bare facts immediately inspire such questions as (*a*) How does the light react upon the chemical? (*b*) Why does syrup hydrolyze in the light and to a lesser extent in the dark? (*c*) Why does lard turn rancid in the dark as well as in the light?

These queries coming within our ken, set us to work on certain experiments which we hoped would explain some of the phenomena observed, but up to the present time, the results of this phase of our work have been far from satisfactory Hesitatingly we raise the following questions

(1) Of the many possible causes of deterioration the four outstanding are heat, light, air and moisture Is it possible that air and moisture play a more important rôle in the deterioration phenomena than does light?

[1] Actually improved by action of light rays

[2] When preserving catalyst is present

(2) In the case of the average light-sensitive chemical, does light act directly or merely as an accelerator of oxidation or reduction?

(3) In certain cases, notably the halide salts of such metals as silver, mercurous mercury and iron, the reducing action of light is clearly discernible Thus photographic studies have cleared up the situation as far as the silver halides are concerned Will further investigations of other metallic compounds indicate definitely which deteriorations due to light are reducing and which are oxidizing phenomena?

(4) In rancidity, is not the deterioration due to presence of air and moisture rather than to light?

We hope in the near future to make further efforts toward answering these interesting questions

COLLEGE OF PHARMACY,
COLUMBIA UNIVERSITY,
July 10, 1934

THE STABILIZATION OF SYRUP OF FERROUS IODIDE, U S P X*[1]

BY WILLIAM J HUSA[2] AND LYELL J KLOTZ[3]

INTRODUCTION

Ferrous iodide was discovered by Courtois (1) who reported its preparation in 1811 It was introduced into medicine in 1824 by Dr Pierquin (2) who used the chemical as prepared by Caillot (3), a French pharmacist In 1831, Pierquin (4) published formulas for the administration of ferrous iodide in the form of a water, chocolate, pastille, salve, tincture and wine and added that 2 oz of the salt in sufficient water might be used for bathing The voluminous literature concerning Syrup of Ferrous Iodide has been adequately reviewed (5) The purpose of the present investigation was to evaluate previous work, determine the mechanism and rate of decomposition and effect a satisfactory method of stabilization

EXPERIMENTAL

Chemicals and Reagents—Two kinds of iron wire were employed, *i e*, card teeth and Merck's Reagent Iron The former assayed 99 6% iron and contained 0 07% of sulphur as well as some carbon and silicon, the latter showed 99 9% iron and contained 0 05% sulphur as well as traces of silicon Sulphur was determined by the cadmium acetate absorption method (6)

Mallinckrodt's U S P and Merck's C P and Reagent Iodine were used Mallinckrodt's U S P Hypophosphorous Acid assaying 31 04% H_3PO_2 was employed Colgate's C P glycerin, Merck's C P dextrose and U S P Honey were used The sucrose satisfied all U S P requirements, its specific rotation at 22° C was 66 15 determined according to the U S P method Distilled water having a p_H of 5 7 was used throughout

General Methods—All volumetric and gravimetric work was carried out using calibrated weights and apparatus The progress of decomposition was followed in most cases by titration of free iodine using approximately 0 01*N* solution of sodium thiosulphate and freshly prepared starch T S

---

* Scientific Section, A PH A, Washington, D C, 1934

[1] This paper is based on a dissertation submitted by Lyell J Klotz to the Graduate Council of the University of Florida in partial fulfilment of the requirements for the degree of Doctor of Philosophy, June 1934

[2] Head Professor of Pharmacy, University of Florida

[3] Graduate Scholar, University of Florida, 1932–1934

Assays for total iodide were performed by the U S P method using approximately 0 1*N* silver nitrate V S and titration with approximately 0 1*N* potassium thiocyanate V S according to the Volhard method

Since ferrous iron cannot be determined in solutions of an iodide by means of permanganate and the dichromate method is tedious and unsatisfactory, a modified permanganate method was developed This method consisted in the addition of excess silver nitrate to the sample thus precipitating the iodide, and subsequent determination of ferrous iron with potassium permanganate V S The procedure was as follows An accurately measured quantity of the solution to be assayed is placed in a flask and a slight excess of 0 5*N* silver nitrate solution added after dilution of the sample with distilled water An excess of Diluted Sulphuric Acid is then added and the mixture titrated with potassium permanganate V S The validity of this method was established by standardization of a permanganate solution against weighed quantities of ferrous ammonium sulphate separately and in mixtures containing iodine, iodides, ferric iron or combinations of these substances

Hydrogen ion concentrations were determined by means of a La Motte block comparator and color standards the hydrogen electrode and the quinhydrone electrode being unsuitable for use with ferrous salts

Storage of solutions and syrups was made in ordinary prescription bottles or in bottles of comparable alkalinity A Freas thermostat maintaining a temperature of 30° C ± 01°, a Freas electric oven maintaining a temperature of approximately 50° C and an electric refrigerator maintaining a temperature of about 6° C were employed

The effects of various spectrum bands were obtained by the use of a series of light filters obtained from the Corning Glass Works Quartz flasks were used for determinations involving ultraviolet light

Variations in Reaction Time —It has been stated that despite the simplicity of this reaction, the direct union of iron and iodine in aqueous solutions does not proceed uniformly to completion in various instances (7) Solutions of ferrous iodide were prepared from card teeth and from iron wire (Reagent grade) using various grades of iodine, and the reaction vessel was maintained in every case at constant temperature ranging between 21° and 26° C for various samples Efficient, uniform mechanical stirring was provided and the end-point taken as the time at which the solution was free from iodine In no case was there a significant difference in the time of reaction Ten solutions were prepared, the time ranging from one hour and twenty-five minutes to one hour and fifty minutes The addition of carbon to solutions prepared from Reagent iron did not alter the reaction time Insoluble residues from card teeth solutions were invariably black in color, those from Reagent iron samples were light brown

The Effect of Variations in Manufacture —The U S P X directions for the manufacture of Syrup of Ferrous Iodide allow considerable latitude in interpretation The phrase "cooling the flask as necessary" implies that volatilization of the iodine should be prevented, but no definite instructions as to the reaction temperature are given Similarly, the end-point of the reaction is not well defined It was found in this investigation that the green color so eagerly sought in this preparation is due, not to the salt at the concentration present, but to the presence of minute traces of iodine In the preparation of aqueous solutions, this is best avoided by allowing sufficient time for the reaction and testing for the end-point with starch T S before subsequent application of heat

In this investigation, solutions of ferrous iodide were prepared by direct union using various grades of chemicals and by double decomposition In the direct

union reaction, various degrees of heat were used during the progress of the reaction and at its completion No visible differences were apparent in the finished preparations On the other hand, these solutions had different p_H values, contained different quantities of iron and left different types of residues upon filtration of the reaction mixtures

Using card teeth as the source of iron, it was found that regardless of the amount of heat employed or the quality of the iodine used, the p_H varied between p_H 3 2 and p_H 4 2 with the usual value at p_H 3 2 for the preparation of 2 liters of solution On the other hand, a variation between p_H 3 4 and p_H 4 7 was noted in the case of samples prepared from Reagent iron In this case, the usual value was p_H 4 1 These values resulted from 30 determinations

Solutions prepared by double decomposition between Mallinckrodt's barium iodide and Merck's Reagent ferrous sulphate varied between p_H 3 2 and p_H 4 7

Residues from card teeth samples were invariably black in color while those from Reagent iron were light brown The former residues were apparently carbon and the latter were ferric hydroxide

The formation of ferrous iodide from iron and iodine has always been considered to be a simple direct union reaction However, as the reaction proceeds, hydrolysis of the product occurs thus giving rise to hydrogen ions and iodide ions Since iron reacts according to the equation

$$Fe + 2\,H^{+} \rightleftharpoons Fe^{++} + H$$

it was thought that the solution might contain iron in excess of the quantity calculated from the iodide content Gravimetric determinations of the amount of iron remaining unconsumed after expiration of the reaction indicated that more iron was used than could be accounted for upon the basis of the iodide content of the solution Volumetric analyses of the solutions further indicated that this excess iron appeared in the solution The excess amounted to approximately 2×10^{-3} mols/L of ferrous iron in the case of card teeth solutions and approximately 8×10^{-3} mols/L of ferrous iron in the case of the Reagent iron samples

An analysis of the residues remaining after filtration of the reaction mixture indicated that nearly twice as much iron was present in the ferric state in Reagent iron samples as in card teeth residues In solutions prepared from Reagent iron in an atmosphere of pure hydrogen, however, the quantity of ferric hydroxide formed was negligible

The addition of carbon and ferrous sulphide to reaction mixtures of Reagent iron and iodine did not have any significant effect upon the p_H values of the resulting solutions

Previous washing of the card teeth used with strong alkali solutions and dilute acid, did not alter the results as outlined above

The Evolution of Gases—It has been suggested that reduction of the carbon present as impurity in the iron results in the formation of unsaturated hydrocarbons On the other hand, it appeared possible that if carbon acts as a reducing agent, carbon dioxide might be formed

The gases were passed through standardized potassium permanganate solutions in certain instances and through lime water in others Negative results were

obtained in every case with both Reagent iron and card teeth The addition of carbon to Reagent iron reaction mixtures was without effect.

The Variation of Hydrogen-Ion Concentration with Time—As a result of 50 experiments, it was found that regardless of the form of iron or iodine used or of the original p_H value of the solution, the p_H dropped rapidly to p_H 3 2 No further changes occurred during the observation period of 1 year Precipitation accompanied this drop in p_H value although it continued after the hydrogen-ion concentration had reached stability It was found that solutions of high p_H, *i e*, 4 1 or higher, remain at that point for some time before gradually becoming more acidic Tests showed that ferrous sulphate solutions of comparable concentration exhibit a similar behavior

The Hydrolysis of Ferrous Iodide—Since ferrous iodide is the salt of a weak base and strong acid, it is logical to expect hydrolysis to occur Despite this fact, the U S P VIII specified that the preparation should be neutral in reaction The ionization constant for the base concerned is not available in the literature, consequently, experimental determinations were necessary in order to determine the degree of hydrolysis Obviously, it is possible for hydrolysis to occur in either of two ways [1]

$$\text{(I)} \quad FeI_2 + HOH \rightleftharpoons Fe(OH)I + HI$$
$$\text{(II)} \quad FeI_2 + 2HOH \rightleftharpoons Fe(OH)_2 + 2HI$$

wherein the mechanism of equation (I) is represented by the ionic equilibria

$$\text{(III)} \quad (FeI)^+ + (OH)^- \rightleftharpoons Fe(OH)I$$
$$\text{(IV)} \quad (H)^+ + (OH)^- \rightleftharpoons HOH$$

which may be combined in the simple equilibrium equation

$$\text{(V)} \quad (FeI)^+ + HOH \rightleftharpoons Fe(OH)I + (H)^+$$

Applying the Law of Mass Action to equation (III), denoting concentrations by square brackets and neglecting activity coefficients,

$$\text{(VI)} \quad K_h = \frac{[FeI^+]\,[OH^-]}{[Fe(OH)I]}$$

Since $(OH)^- = K_w/(H)$, where K_w is the ion product of water, equation (VI) may be written

$$\text{(VII)} \quad \frac{K_w}{K_h} = \frac{[Fe(OH)I]\,[H^+]}{[FeI^+]}$$

Upon making the simplifying assumptions that the salt and acid are completely ionized, letting v be the molar dilution of salt and z be the fraction hydrolyzed, then

$$[FeI^+] = 1 - z/v, \quad [H^+] = [Fe(OH)I] = z/v$$

whence[2] we have from equation (VII),

[1] Similar expressions for salts containing multivalent ions were developed by Denham (8)

[2] This expression is true only if we neglect the hydrogen-ion concentration of the water used The latter, however, is small compared with that furnished by the hydrolysis of the salt Such an assumption is usually made in cases of this kind

$$\text{(VIII)} \qquad \frac{K_w}{K_{b1}} = \frac{z^2}{v(1-z)} = K_1$$

If, on the other hand, we treat equation (II) similarly, we have, using identical nomenclature,

$$\text{(IX)} \qquad \frac{K_w^2}{K_{b1}} = \frac{[Fe(OH)_2]\,[H^+]^2}{[Fe^{++}]}$$

In this case, however,

$$[Fe^{++}] = 1 - z/v, \quad [Fe(OH)_2] = z/v, \quad [H^+] = 2z/v$$

and, substituting these values in equation (IX),

$$\text{(X)} \qquad \frac{K_w^2}{K_{b2}} = \frac{4z^3}{v^2(1-z)} = K_2$$

Thus, since K_w may be taken as approximately 1×10^{-14}, $[H^+]$ can be determined experimentally and v is known, it is possible to calculate definite values for z, K_1 and K_2 A constant set of values for K_1 is taken as evidence of the applicability of equation (VIII) and similar values for K_2 indicate that equation (X) may be applied

A solution of ferrous iodide was prepared in an atmosphere of hydrogen, using Reagent grade chemicals and recently boiled, distilled water One-half of this solution was allowed to stand until p_H 3 2 was attained, the other was immediately treated Both solutions were subjected to a series of dilutions, the p_H values being determined at each dilution and the values of z, K_1 and K_2 calculated in each case These data follow in Tables I and II wherein the column 100 z refers to the degree of hydrolysis on the basis $z = v\,[H^+]$, since equation (VIII) was found applicable

TABLE I —DEGREE OF HYDROLYSIS OF AQUEOUS SOLUTIONS OF FERROUS IODIDE

Freshly Prepared Solution

Conc Mols/L	v	p_H	$[H^+]$	100 z	$K_1 \times 10^7$	$K_2 \times 10^7$
0 235000	4 255	4 20	$6\ 31 \times 10^{-5}$	0 027	0 17	0 53
0 117500	8 511	4 35	$4\ 47 \times 10^{-5}$	0 038	0 17	0 38
0 058750	17 022	4 70	$2\ 00 \times 10^{-5}$	0 034	0 07	0 07
0 029375	34 044	4 95	$1\ 12 \times 10^{-5}$	0 038	0 04	0 02
0 014688	68 088	5 05	$8\ 91 \times 10^{-6}$	0 061	0 05	0 02
0 007344	136 176	5 15	$7\ 08 \times 10^{-6}$	0 096	0 07	0 02
0 003672	272 352	5 20	$6\ 31 \times 10^{-6}$	0 172	0 11	0 03

TABLE II —DEGREE OF HYDROLYSIS OF AQUEOUS SOLUTION OF FERROUS IODIDE

Solution Allowed to Stand until Equilibrium at p_H 3 2 Reached

Conc Mols/L	v	p_H	$[H^+]$	100 z	$K_1 \times 10^6$	$K_2 \times 10^{11}$
0 23600	4 238	3 15	$7\ 08 \times 10^{-4}$	0 30	2 12	75 23
0 11800	8 476	3 55	$2\ 82 \times 10^{-4}$	0 24	0 67	9 49
0 05900	16 952	3 80	$1\ 59 \times 10^{-4}$	0 27	0 43	3 38
0 02950	33 904	4 05	$8\ 91 \times 10^{-5}$	0 30	0 26	1 20
0 01475	67 808	4 30	$5\ 02 \times 10^{-5}$	0 34	0 17	0 43
0 00738	135 616	4 40	$3\ 98 \times 10^{-5}$	0 54	0 21	0 42

(To be continued)

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

APPARATUS AND MANIPULATIONS

Anon
Apparatus for vacuum distillation on a small scale
Schweiz Apoth Ztg 72 (1934), 261, 289
Anon
Special machines for the pharmacist
Pharm Ztg 79 (1934) 620
Anon
Extraction apparatus (The "Mulkolator")
Pharm Ztg , 79 (1934), 620
Berry, H
An improved vacuum concentration apparatus
Pharm J , 132 (1934), 587
Rosenthaler, L
Researches on galenical preparations II Studies on repercolation
Monatsbeilage Pharm Presse 5 (1934), 57

PHARMACEUTICAL PREPARATIONS

Bentzen, H
Basic aluminum acetate solution
Dansk Tids Farm , 8 (1934) 141
Brown, H Treves
A simple method of calculating isotonic solutions
Pharm J 132 (1934), 633
Danckwortt, P W
Photometric color measurements of tincture of valerian
Arch Pharm , 272 (1934) 716
DeClercq A
Microbial infection of pharmaceutical products
J pharm Belg , 16 (1934) 435
Jackson F J
Note on isotonic solutions
Chem & Drug 120 (1934) 694
Jermstad, Axel and Ostby, Ottar
Study of syrups
Dansk Tids Farm , 8 (1934), 137
Rupp E
Valerian preparations of the new Swiss Pharmacopœia
Apoth-Ztg 49 (1934), 712
Schwartz, Charles, Jr
Study of Fowler's solution
JOUR A PH A 23 (1934), 565
Searle, Alfred B
Lemonade powders
Chem & Drug , 120 (1934), 618
Todd, J P and Smith H L
Bacterial content and bactericidal action of some common medicaments
J Roy Tech Coll , 3 (1934) 324–326, through *J Soc Chem Ind* 53 (1934), 474B

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Chessa, G
Stabilization of the active principles of digitalis
Arch farmacol sper , 57 (1934) 96–103, through *J Soc Chem Ind* , 53 (1934) 475
Coppens Ph A
Effect of the constituents of cod liver oil on the tubercle bacillus
Pharm Weekbl 71 (1934) 584
Jackson Harry and Duvall Albert I
Report of a case of dinitrophenol poisoning
J A M A 102 (1934), 1844
Klingensmith, William R
Poisoning by camphor
J A M A 102 (1934) 2182
Krechetova N P and Yankovski, V D
Increasing the activity of heparin and pneumin (antithrombin)
Khim Farm Prom (1933), 225, through *J Soc Chem Ind* , 53 (1934) 525B
Meredith Florence L
Reactions to certain barbital derivatives
J A M A , 102 (1934) 2099
Munch James C
Human thallotoxicosis
J A M A 102 (1934) 1929
Offerhaus C and Baert C G
Anesthetics, particularly cocaine and novocaine
Pharm Weekbl 71 (1934), 666
Ogata A *et al*
Investigation of the male sex hormones
J Pharm Soc Japan No 626 (1934) 49

Scarf, Maxwell
Serious arsphenamine reactions with reference to their prevention
J A M A, 102 (1934), 2159
Schwarz A John
Standardization of Digitalis
Am J Pharm, 106 (1934), 196
Smith Maurice I
A comparative pharmacologic study of the three phosphoric esters of orthocresol
J Pharmacol & Exper Therap, 51 (1934), 217
Walton Robert P, and Lawson, Edwin H
Pharmacology and toxicology of the azo dye, phenyl - azo - alpha - alpha - diaminopyridine (pyridium)
J Pharmacol & Exper Therap 51 (1934), 200

BOTANY AND PHARMACOGNOSY

Danckwortt P W, and Schütte E
Investigation of the chemical constituents of the drug known in commerce as "Cortex Piscidiæ Erythrinæ"
Arch Pharm, 272 (1934), 701
Giroux J, and Susplugas J
External morphology of Grindelia robusta
Bull sci pharmacol 41 (1934), 265
Husa, William J, and Riley, Donald E
Study of the constituents of Siam benzoin in relation to their preservative action on lard
Jour A Ph A, 23 (1934), 544
Itano, A
Agar
Ber Ohara Inst Landw Forsch, 6 (1933), 59–72, through *J Soc Chem Ind*, 53 (1934) 475B
Leger E
New adulteration of aloe
J pharm chim, 19 (1934), 533
Maheu J, and Chartier, J
Pharmacography of digitalis
Bull sci pharmacol, 41 (1934) 280
Munesada, T
Pharmacognostical examination of the roots and rhizomes of Scrophularia species
J Pharm Soc Japan No 626 (1934) 41
Regnier, Jean, and Neipp, Lucien
Contribution to the study of the methods for counting micro organisms
Bull sci pharmacol 41 (1934), 291
Slama Frank J
Comparative study of the Maryland sennas
Jour A Ph A 23 (1934) 550
Wagenaar M
Relationship between essential oil and alkaloidal content of plants
Pharm Weekbl, 71 (1934), 642

ALKALOIDS AND GLUCOSIDES

Anon
Ephedrine and pseudo-ephedrine compared
Pharm J 132 (1934) 639
Bagnall, H H
Extraction of quinine
Analyst, 59 (1934), 277, through *J Soc Chem Ind*, 53 (1934), 525B
Bergsteinsson and Noller, C R
Saponins and Sapogenins I Echinocystic Acid
J Am Chem Soc 56 (1934) 1403
Dafert O, *et al*
Contribution to the knowledge of saponins
Monatsbeilage Pharm Presse 5 (1934) 49
Dietzel R and Kuhl G W
Decomposition of alkaloids in aqueous solution, particularly during sterilisation 9 Cocaine substitutes
Arch Pharm 272 (1934) 721
Gillot P and Tucakov Y
Contribution to the study of some tannins
Bull sci pharmacol 41 (1934), 257
Girault F
Determination of alkaloids in pharmaceutical preparations A review
J pharm chim 19 (1934), 499, 536
Ortegren, R
Determination of the exact equivalents of some alkaloids
Farm Revy 33 (1934) 313
Orechoff A
Investigation of the medicinal and poisonous plants of the UdSSR and their alkaloidal content
Arch Pharm, 272 (1934) 673

OILS FATS AND WAXES

Anon
Purified and sterilised olive oil
Pharm J 132 (1934) 635
Cook, J W, and Haslewood, G A D
The constitution of ergosterol
J Soc Chem Ind 53 (1934) 507

ESSENTIAL OILS

Clevenger, J F
Volatile oil in cardamon seed
J Assoc Official Agric Chem, 17 (1934), 283
Fischer, R and Moor, A
Detection of aldehydes and ketones in essential oils and drugs
Arch Pharm, 272 (1934), 691

Francois, Th
Gelification of oils of the "Aleurites" by the halogen salts of antimony
Bull sci pharmacol, 41 (1934) 269
Nelson, E K, and Mottern, H H
Florida grape fruit oil
Ind Eng Chem, 26 (1934), 634
Weevers, Th
Formation of aromatic substances and terpenes in plants
Pharm Weekbl, 71 (1934), 621

GENERAL AND PHYSICAL CHEMISTRY

Rae, John
The adsorptive properties of various soluble compounds
Pharm J, 132 (1934), 607
Schuster, G
Use of camphor in cryoscopy for the determination of the molecular weight of the arsenic acids
J pharm chim, 19 (1934), 497

ANALYTICAL METHODS AND RESULTS

Denigès, G
New rapid direct method for the determination of mercury applicable to mercury cyanide
Bull soc pharm Bordeaux, 72 (1934), 5
Gross C R and Smith, C M
Colorimetric method for determination of rotenone
J Assoc Official Agric Chem 17 (1934), 336
Killinen, K
Values of Finnish Dryopteris Filix mas and D spinulosa extracts
Finlands Apotek Tidskr No 8–9 (1932), 149–158, *Chem Zentr*, 2 (1933), 3453–3454, through *J Soc Chem Ind*, 53 (1934), 475
Korenmann, J M
Sensibility of the iodoform reaction
Z anal Chem, 93 (1933), 335 through *Schweiz Apoth-Ztg*, 72 (1934), 302
Lillig, R
Nitric acid as a reagent for the colorimetric identification of alkaloids
Pharm Ztg, 79 (1934), 593
Peyer, W, and Hamann, G
Testing and assaying of ointments
Pharm Monatsh 15 (1934) 110
Weis Edmund
Evaluation of medicinal charcoal
Monatsbeilage Pharm Presse, 5 (1934), 56

ORGANIC CHEMICALS

Clemence, Leroy W, and Raiziss Geo W
Isomeric nitro-cresols
Jour A Ph A, 23 (1934), 536
Harris S E, and Christiansen, W G
Preparation and germicidal properties of some alkyl derivatives of hydroxy diphenyls
Jour A Ph A, 23 (1934), 530
Poore, H D
Recovery of naringin and pectin from grapefruit residue
Ind Eng Chem, 26 (1934), 637
Rosenberg, Edward F, *et al*
Some 5-β-ethyl substituted derivatives of barbituric acid
J Am Chem Soc, 56 (1934) 1339

A COMPARISON OF NEOARSPHENAMINE AND SULPHARSPHENAMINE WHEN THEY ARE DIALYZED *

BY A E JURIST AND W G CHRISTIANSEN

It is well known that both neoarsphenamine and sulpharsphenamine are colloids, at least in part Several investigators have subjected neoarsphenamine to dialysis and thereby demonstrated this fact Extensive investigations have been made on neoarsphenamine by Freundlich, Stern and Zocker (1), Hirschfelder and Wright (2), and Raiziss and Gavron (3), but none of these investigators have compared neoarsphenamine and sulpharsphenamine In this paper we shall describe a method for carrying out the dialysis of neoarsphenamine or sulphars-

* Section on Practical Pharmacy and Dispensing Madison meeting, 1933

phenamine under anærobic conditions and the results obtained when this method is used

These results show a very distinct difference in the behavior of these two compounds upon dialysis When neoarsphenamine is dialyzed for twenty-four hours with running water 61 4% of the arsenic and 17 5% of the sulphur remain in the dialysis bag, these are averages from a number of experiments with a single brand of neoarsphenamine in which the undialyzable arsenic varied between 51 7 and 75 5% and the undialyzable sulphur between 13 6 and 21 7% During the dialysis a precipitate forms in the originally clear solution, this precipitate dissolves upon addition of sodium hydroxide and re-forms when CO_2 is passed into the alkaline solution On the other hand sulpharsphenamine shows only 39 7% of the arsenic and 28 9% of the sulphur still undialyzed, these are averages of several experiments with a single brand of sulpharsphenamine in which the undialyzable arsenic varied between 28 0 and 55 18% and the undialyzable sulphur between 16 7 and 35 77% Sulpharsphenamine solutions remain clear throughout the dialysis

Since the per cent arsenic lost by dialysis of sulpharsphenamine is greater than with neoarsphenamine and since the reverse is true for the sulphur content, there is strong evidence that a distinct difference exists in the structures of neoarsphenamine and sulpharsphenamine This fact was first pointed out by Jurist and Christiansen (4) However, in addition to the differences in the chemical structure of these compounds a distinct dissimilarity in colloidal character is indicated This can be ascribed either to the fact that the colloidal particles of neoarsphenamine are much larger than those of sulpharsphenamine or to the fact that a much larger portion of the latter is in the true solute form The latter is the more probable explanation since the dialyzing membrane used here is of a type which usually retains colloids even when highly dispersed

In addition to these experiments on a single brand of neoarsphenamine and a single brand of sulpharsphenamine a series of experiments were carried out on single lots of the different market brands of neoarsphenamine The results of these experiments are briefly summarized in the following tabulation

Brand of Neoarsphenamine	% of Original Arsenic Undialyzed	% of Original Sulphur Undialyzed	Condition of Undialyzed Solution
A	76 8	16 4	Precipitated
B	44 9	11 2	Clear
C	73 9	10 4	Precipitated
D	63 0	19 0	Precipitated
E	57 7	9 8	Precipitated
F	29 3	21 5	Clear
G	54 6	14 8	Precipitated

These results show wide variations in the undialyzable arsenic ranging from 29 3% to 76 3% and definite, but smaller differences in the undialyzable sulphur ranging from 9 8 to 21 5% The results obtained with brands "C" and "G" are very similar to those obtained with sulpharsphenamine and further these two brands show one of the other characteristics of sulpharsphenamine, namely, that the undialyzed solution is clear and not precipitated This series of experiments further emphasizes the fact that there are wide differences between different brands of neoarsphenamine, especially since two brands show characteristics more like those of sulpharsphenamine than neoarsphenamine The differences in the chemi

cal composition of market brands of neoarsphenamine pointed out by Elvove (5) and by Jurist and Christiansen (6) appear to extend also to differences in behavior on dialysis

EXPERIMENTAL

A solution of 6 Gm of Parlodion (DuPont) in 50 cc of ether and 50 cc of ethyl alcohol is prepared according to the directions of Eggerth (7) This solution is poured into a clean, dry 500 cc Erlenmeyer flask, and by rotating the flask as the solution is poured out slowly the entire inside of the flask is coated with the solution The flask is then allowed to drain, inverted for 15 minutes Then the membrane in the upper part of the neck of the flask is loosened by means of a knife blade The inside of the flask containing the membrane is filled with water and then emptied to insure wetting the entire inner surface of the membrane then water is poured between the membrane and the wall of the flask, loosening the membrane from the side of the flask as the flask fills When the membrane has been loosened from the flask it can be easily pulled out, it must not be allowed to dry out Immediately cut off that portion of the membrane which was inside the neck of the flask Carefully open the membrane at the top so that a glass tube $^1/_2$ inch in diameter can be inserted for a distance of $^3/_4$ of an inch Then the membrane is attached to this tube by wrapping around the tube a $^1/$ inch wide strip of adhesive tape This should fit as tightly as possible Then the membrane in the collapsed state is put in the dialysis bath and suspended in it by means of a clamp on the glass tube The membrane is filled, through the glass tube, with water and lifted slightly so that 1 5 inches of the membrane are out of the water and exposed to the air Then the exposed portion of the membrane as well as the strip of adhesive tape and the glass tube for a short distance are painted with a complete but thin coat of shellac Any excess of shellac lying on the surface of the water of the dialysis bath is immediately skimmed off before it can harden When the shellac is dried (about one hour is required for this), the exposed portions of the membrane, etc , are painted with a coat of the same Parlodion solution which was used in preparing the membrane When this has dried the membrane is carefully emptied by removing it from the clamp and inverting it This also serves to sweep the air out of the membrane as it collapses It is then put back in the bath and the neoarsphenamine solution put in it In our experiments 0 9 Gm of neoarsphenamine was dissolved in 20 cc of water The atmosphere above the neoarsphenamine solution is cleared of air with a nitrogen stream using care to avoid breaking the membrane Then a slight positive pressure of nitrogen is obtained by closing the glass tube with a one hole stopper which is connected to a small gasometer Before the membrane is expanded by the gas pressure it should be lifted by means of the clamp and glass tube to such a position that the surface of the neoarsphenamine solution inside the membrane is just below the surface of the water in the dialysis bath The membrane containing the solution must then be lowered from time to time as the dialysis proceeds and causes it to increase in volume Such an apparatus as this has been found to be entirely leak proof and can be maintained under anærobic conditions A sufficiently extensive dialysis of neoarsphenamine has been obtained by dialyzing in running water for 24 hours The temperature of the water was maintained at 20° C through out

When the dialysis has been completed the solution is transferred anærobically to a glass stoppered cylinder Any precipitate present is dissolved by means of sodium hydroxide Then aliquot portions of this solution are used for arsenic and sulphur assays The arsenic was determined by the Newbery (8) method and the sulphur by the method described by Elvove (5) The per cent of the total sulphur and arsenic remaining after dialysis can then be readily obtained by the following

$$\frac{\text{Gm Arsenic Undialyzed} \times 100}{\text{Gm Total Arsenic Present}} = \% \text{ Arsenic Undialyzed}$$

$$\frac{\text{Gm Sulphur Undialyzed} \times 100}{\text{Gm Total Sulphur Present}} = \% \text{ Sulphur Undialyzed}$$

This method has been applied successfully to both neoarsphenamine and sulpharsphenamine and typical results are given in the table below It is interesting

to note that at the end of 24 hours' dialysis there was a precipitate in the solution remaining in the dialysis bag in the case of neoarsphenamine, but none in the case of sulpharsphenamine This precipitate was flocculent in character and was readily soluble in sodium hydroxide

TABLE I

Compound	Total Arsenic Present—Mg before Dialysis	Total Sulphur Present—Mg before Dialysis	Undialyzed Material			
			Arsenic		Sulphur	
			Mg	%	Mg	%
Neoarsphenamine	178 2	56 4	111 0	66 3	10 4	18 5
Sulpharsphenamine	197 5	95 4	72 4	38 4	29 7	31 1

CONCLUSIONS

1 These results show that neoarsphenamine has a larger undialyzable arsenic content than sulpharsphenamine

2 It is also shown that the sulphur content of sulpharsphenamine is less readily removed by dialysis than that of neoarsphenamine

3 In the course of the dialysis of neoarsphenamine a portion of the material remaining undialyzed precipitates in the dialysis bag This is not true in the case of sulpharsphenamine

4 The previous conclusion of a fundamental structural difference between neoarsphenamine and sulpharsphenamine is confirmed

REFERENCES

(1) Freundlich, Stern and Zocker, *Biochem Z*, 138 (1923) 307
(2) Hirschfelder and Wright *J Pharmacol* 39 (1930), 13
(3) Raizıss and Gavron *Ibid* 20 (1922) 163
(4) Jurist and Christiansen JOUR A PH A 19 (1930), 951
(5) Elvove U S P H Repts 40 (1925) 1235
(6) Jurist and Christiansen *J Am Chem Soc*, 50 (1928), 191
(7) Eggerth *J Biol Chem*, 48 (1921) 203
(8) Newbery *J Chem Soc*, 127 (1925) 1751

RESEARCH DEPARTMENT OF THE CHEMICAL
AND PHARMACEUTICAL LABORATORIES
E R SQUIBB AND SONS BROOKLYN N Y

THE POTASSIUM MERCURIC IODIDE REAGENTS FOR ALKALOIDS

BY JANET TRAVELL, M D

A number of potassium mercuric iodide solutions have been recommended as precipitating reagents for alkaloids Of these, Mayer's reagent is the most widely used and is regarded as an exceedingly sensitive qualitative solution for alkaloids in general It was found, however, that this reagent would not detect codeine unless present in a concentration of at least 1 in 5000 parts, but that modification of the reagent rendered the reaction with codeine and other alkaloids much more delicate These experiments show that Mayer s reagent, which is advocated as a qualitative test solution by the United States Pharmacopœia X and by textbooks generally, is probably the least sensitive of the potassium mercuric iodide reagents which have been described It seemed worth while, therefore,

to review the literature in some detail, which I have found rather inaccessible, and to call attention to certain practical points concerning the use of these reagents, which may not be familiar to those not working constantly with them, or to whom the early literature is not available

It is conceded that Winckler, court pharmacist at Zwingenberg (1), in 1830 prepared the first iodomercurate of an alkaloid (2) The introduction of the potassium mercuric iodide solutions as general qualitative reagents for the alkaloids is attributed to A von Planta Reichenau (3), who in 1846 in a dissertation at Heidelberg gave them a prominent place among the alkaloidal reagents (4) After a lapse of several years, interest in this type of alkaloidal reagent reappeared in several parts of the world Delfs (5) in 1854 observed that twelve non-volatile alkaloids were precipitated by his potassium iodomercurate solution, some even in high dilution, but he did not state the strength of his reagent Nessler (6) in Germany in 1856 adapted the potassium mercuric iodide reagent as a qualitative test for ammonia in strongly alkaline solution, incidentally calling attention to its property of precipitating certain alkaloids in acid or slightly alkaline solution de Vrij (7) in Holland in 1857 stated that 1/50,000 grain of strychnine could be detected if a drop of liquid were suspended in a capillary tube and a solution of the iodide of mercury and potassium added Groves (8) in England in 1858 described the properties of a class of compounds, the bromo- and iodomercurates of the alkaloids, which he believed had escaped general attention He did not directly describe the reagent which he used, but studied the properties and composition of the crystalline precipitates obtained with nine alkaloids

Finally, in 1862 Valser (9) in Paris and Mayer (3) in New York published reports almost simultaneously on the use of potassium mercuric iodide solutions as general alkaloidal reagents Valser alluded to de Vrij as the originator of the test, Mayer, to Groves Valser's thesis, dated July 22nd, was the prize essay of the Société de Pharmacie (not a student dissertation) for the year 1862 (10) He advocated the use of a reagent which he prepared by saturating a 10 per cent (10 100) solution of potassium iodide with mercuric iodide to detect the presence of an alkaloid in an extract obtained by the method of Stas He analyzed some of the alkaloidal precipitates and arrived at practically the same general formula for them as had Groves He also used his reagent quantitatively to determine the molecular equivalents of certain alkaloids, and concluded that quinidine was an isomer and not a polymer of quinine He noted that the presence of albumins and extracted principles might interfere with the results when the reagent was employed for the quantitative titration of alkaloids Abstracts (11, 12, 13) of Valser's thesis promptly appeared in several journals in different countries, and it is difficult to understand why the Valser reagent received so little recognition except that none of these abstracts contained the exact formula for his reagent, and so far as I have been able to learn, his original paper was not printed in one of the scientific journals, nor did any further papers by Valser follow

Mayer's (3) original paper on this subject was read at the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in August 1862, and the next year an abstract (14) was published in the same number of the PROCEEDINGS as was a brief abstract (11) of Valser's thesis Mayer claimed to have developed a new method for the volumetric estimation of alkaloids by means of titration with his potas-

alkaloids (21) He noted that Mayer's solution contained an excess of potassium iodide, while in the reagents described by other authors there was a slight excess of mercuric iodide He pointed out that the concentration of the potassium iodide solution from which the reagent was prepared affected the composition of the reagent Thus in a solution saturated with potassium iodide, the double iodides which he depicted as $(HgI)_2KI$ and HgI KI were formed, for under these conditions 3 mols of mercuric iodide required 2 mols of potassium iodide for solution, but owing to secondary decomposition of the salt $(HgI)_2KI$ a dilute solution ultimately contained only the iodide HgI KI He found that 10 Gm potassium iodide in 10 per cent solution dissolved 14 73 Gm mercuric iodide at 20° C , instead of the theoretical 13 68 Gm required for the formation of the iodide HgI KI, or the 21 44 Gm of the iodide $(HgI)_2KI$ alone He concluded, therefore, that the solution of potassium iodide directed in the preparation of Valser's reagent was sufficiently concentrated to retain in solution a certain amount of the compound $(HgI)_2KI$

Tanret (21) compared the sensitiveness for various alkaloids of Mayer's and of Valser's reagents His purpose in making this comparison is implied in his statement "I observed that the iodohydrargyrates of the alkaloids are all more or less soluble in iodide of potassium, from which it must be concluded that the Mayer's solution which contains an excess of this latter salt is inferior to that of Valser" Alkaloids were tested both as the free base and as the salt, and the results obtained with both reagents were contrasted in a table which I have reproduced in part (Table I)

TABLE I —RESULTS OF TANRET'S TESTS WITH MAYER'S AND VALSER'S REAGENTS *

	Mayer s Solution	Valser s Solution
Atropine base or salt	7,000	40 000
Cocaine base or salt	60,000	240,000
Codeine base	3 000	40 000
salt	8,000	40 000
Morphine, salt	2 000	10 000
Nicotine base	1,200	160 000
salt	17 000	600 000
Pilocarpine, salt	9 400	60 000
Quinine, base	150	360 000
salt	180 000	480 000
Strychnine [1] salt?	50 000	150,000

* The table indicated the number of parts of water in which the alkaloid might be dissolved and yet yield a distinct precipitate with the reagents

[1] Added from the text of the article

Tanret (21) also studied some of the properties of the alkaloidal precipitates, and mentioned several substances which might interfere with the reaction He recommended that tests with Valser's reagent be carried out in neutral solution, and suggested that an alkaloid might be detected in the presence of albumin in acid solution by heating to boiling, filtering while hot and observing the reappearance of the alkaloidal precipitate in the cold

Quite recently attention has been redirected by Munch, Crossley and Hartung (22) to the fact that Mayer's reagent is not the most delicate possible potassium

mercuric iodide reagent, that the sensitivity of successive lots may vary, and therefore they have suggested some modifications in its method of preparation to render it more sensitive Fulton (23) in a classification of the reactions of 91 precipitating agents with alkaloids mentions four types of potassium mercuric iodide solutions which he terms "Mayer's reagent, concentrated Mayer's reagent, acid Mayer's reagent, and Mayer's and KI" All these reagents are prepared from mercuric iodide rather than from mercuric chloride which Mayer used, and the second one, prepared from 10 Gm KI in 100 cc water saturated with HgI_2 (about 15 Gm required), very closely resembles Valser's reagent

In spite of the marked superiority of Valser's over Mayer's reagent, which Tanret demonstrated so strikingly, none of the European Pharmacopœias, not even the French, recommend the use of Valser's reagent, and several of them (24) describe what is essentially Mayer's reagent as a qualitative test solution for alkaloids

EXPERIMENTAL

Reagents—I Mayer's reagent was prepared according to the directions in the United States Pharmacopœia X mercuric chloride 1 358 Gm , potassium iodide 5 0 Gm distilled water to make 100 cc amounts nearly identical with those in Mayer's original formula

II Following a search of the literature with reference to the potassium mercuric iodide reagents, the general description of Valser's reagent was found (21) A reagent was then prepared by adding slowly from a burette a 10 per cent solution (W/V) of potassium iodide to a known weight of red mercuric iodide until the latter just dissolved Under these conditions it was found that at 20° C , 10 Gm of potassium iodide (U S P) would dissolve almost exactly 14 Gm of mercuric iodide (U S P) This differs slightly from the figure 14 73 Gm obtained by Tanret, but 10 Gm of the former salt would not accomplish the solution of 14 73 Gm of the latter even when allowed to remain in contact with it for 24 hours, and after standing in contact with this excess of mercuric iodide the solution contained free iodine It is not clear from the references available by what method Valser s reagent was prepared In any case, the reagent prepared by the method of titration by which the complete solution of the mercuric iodide is just effected by the potassium iodide solution and which proved to be in general the more delicate will be referred to throughout this paper as the Valser reagent

The Valser reagent is a clear, bright yellowish green heavy liquid with a specific gravity of 1 1811 at 25° C When cooled to a temperature of 4° C , red mercuric iodide does not separate out, nor is there any change in the appearance of the solution The reagent does not contain free iodine nor does any develop on standing On diluting the reagent several times with distilled water red mercuric iodide precipitates No precipitate occurs when Mayer's reagent is similarly diluted The Valser reagent does not decompose nor deteriorate with reference to its alkaloidal sensitivity when kept on a shelf in the light (not in direct sunlight) for at least three months, and probably longer

A study was made of the relative sensitiveness of Mayer's and Valser's reagents for some of the commoner alkaloids in pure solution Because of the marked solubility of the precipitates in an excess of Mayer s reagent, and in order to avoid undue dilution of the alkaloid the conditions were arbitrarily fixed so that for each test 0 5 cc of the reagent was added to 5 cc of the alkaloidal solution Tests were usually performed both in neutral and in acid solution, for the latter, dilutions of the alkaloid were made with tenth normal sulphuric acid It was noted that whereas the relatively concentrated solutions of the alkaloids yielded a definite precipitate with the reagents in the more dilute solutions only a characteristic bluish fluorescence appeared, similar to that shown by pure solutions of quinine and quinidine Slight degrees of fluorescence could be seen only when the test tube was held against a background in a suitable light and not by artificial light Disappearance of fluorescence rather than the absence of a precipitate was considered as marking the limit of sensitivity Because of the slowness with which fluorescence may develop when the alkaloid is present in low concentration observations were made for about ten minutes

alkaloids (21) He noted that Mayer's solution contained an excess of potassium iodide, while in the reagents described by other authors there was a slight excess of mercuric iodide He pointed out that the concentration of the potassium iodide solution from which the reagent was prepared affected the composition of the reagent Thus in a solution saturated with potassium iodide, the double iodides which he depicted as $(HgI)_2KI$ and HgI KI were formed, for under these conditions 3 mols of mercuric iodide required 2 mols of potassium iodide for solution, but owing to secondary decomposition of the salt $(HgI)_2KI$ a dilute solution ultimately contained only the iodide HgI KI He found that 10 Gm potassium iodide in 10 per cent solution dissolved 14 73 Gm mercuric iodide at 20° C , instead of the theoretical 13 68 Gm required for the formation of the iodide HgI KI, or the 21 44 Gm of the iodide $(HgI)_2KI$ alone He concluded, therefore, that the solution of potassium iodide directed in the preparation of Valser's reagent was sufficiently concentrated to retain in solution a certain amount of the compound $(HgI)_2KI$

Tanret (21) compared the sensitiveness for various alkaloids of Mayer's and of Valser's reagents His purpose in making this comparison is implied in his statement "I observed that the iodohydrargyrates of the alkaloids are all more or less soluble in iodide of potassium, from which it must be concluded that the Mayer's solution which contains an excess of this latter salt is inferior to that of Valser " Alkaloids were tested both as the free base and as the salt, and the results obtained with both reagents were contrasted in a table which I have reproduced in part (Table I)

TABLE I —RESULTS OF TANRET'S TESTS WITH MAYER'S AND VALSER'S REAGENTS *

	Mayer s Solution	Valser s Solution
Atropine base or salt	7,000	40 000
Cocaine base or salt	60,000	240,000
Codeine base	3 000	40,000
salt	8 000	40 000
Morphine salt	2 000	10 000
Nicotine, base	1 200	160 000
salt	17 000	600,000
Pilocarpine salt	9,400	60 000
Quinine, base	150	360,000
salt	180,000	480 000
Strychnine [1] salt?	50 000	150,000

* The table indicated the number of parts of water in which the alkaloid might be dissolved and yet yield a distinct precipitate with the reagents

[1] Added from the text of the article

Tanret (21) also studied some of the properties of the alkaloidal precipitates, and mentioned several substances which might interfere with the reaction He recommended that tests with Valser's reagent be carried out in neutral solution, and suggested that an alkaloid might be detected in the presence of albumin in acid solution by heating to boiling, filtering while hot and observing the reappearance of the alkaloidal precipitate in the cold

Quite recently attention has been redirected by Munch, Crossley and Hartung (22) to the fact that Mayer's reagent is not the most delicate possible potassium

mercuric iodide reagent, that the sensitivity of successive lots may vary, and therefore they have suggested some modifications in its method of preparation to render it more sensitive Fulton (23) in a classification of the reactions of 91 precipitating agents with alkaloids mentions four types of potassium mercuric iodide solutions which he terms "Mayer's reagent, concentrated Mayer's reagent, acid Mayer's reagent, and Mayer's and KI" All these reagents are prepared from mercuric iodide rather than from mercuric chloride which Mayer used, and the second one, prepared from 10 Gm KI in 100 cc water saturated with HgI_2 (about 15 Gm required), very closely resembles Valser's reagent

In spite of the marked superiority of Valser's over Mayer's reagent, which Tanret demonstrated so strikingly, none of the European Pharmacopœias, not even the French, recommend the use of Valser's reagent, and several of them (24) describe what is essentially Mayer's reagent as a qualitative test solution for alkaloids

EXPERIMENTAL

Reagents—I Mayer's reagent was prepared according to the directions in the United States Pharmacopœia X mercuric chloride 1 358 Gm potassium iodide 5 0 Gm , distilled water to make 100 cc , amounts nearly identical with those in Mayer s original formula

II Following a search of the literature with reference to the potassium mercuric iodide reagents the general description of Valser s reagent was found (21) A reagent was then prepared by adding slowly from a burette a 10 per cent solution (W/V) of potassium iodide to a known weight of red mercuric iodide until the latter just dissolved Under these conditions it was found that at 20° C , 10 Gm of potassium iodide (U S P) would dissolve almost exactly 14 Gm of mercuric iodide (U S P) This differs slightly from the figure, 14 73 Gm obtained by Tanret, but 10 Gm of the former salt would not accomplish the solution of 14 73 Gm of the latter even when allowed to remain in contact with it for 24 hours, and after standing in contact with this excess of mercuric iodide the solution contained free iodine It is not clear from the references available by what method Valser's reagent was prepared In any case the reagent prepared by the method of titration, by which the complete solution of the mercuric iodide is just effected by the potassium iodide solution and which proved to be in general the more delicate, will be referred to throughout this paper as the Valser reagent

The Valser reagent is a clear, bright yellowish green heavy liquid with a specific gravity of 1 1811 at 25° C When cooled to a temperature of 4° C red mercuric iodide does not separate out nor is there any change in the appearance of the solution The reagent does not contain free iodine nor does any develop on standing On diluting the reagent several times with distilled water red mercuric iodide precipitates No precipitate occurs when Mayer's reagent is similarly diluted The Valser reagent does not decompose nor deteriorate with reference to its alkaloidal sensitivity when kept on a shelf in the light (not in direct sunlight) for at least three months and probably longer

A study was made of the relative sensitiveness of Mayer's and Valser s reagents for some of the commoner alkaloids in pure solution Because of the marked solubility of the precipitates in an excess of Mayer s reagent and in order to avoid undue dilution of the alkaloid, the conditions were arbitrarily fixed so that for each test 0 5 cc of the reagent was added to 5 cc of the alkaloidal solution Tests were usually performed both in neutral and in acid solution, for the latter dilutions of the alkaloid were made with tenth normal sulphuric acid It was noted that whereas the relatively concentrated solutions of the alkaloids yielded a definite precipitate with the reagents in the more dilute solutions only a characteristic bluish fluorescence appeared, similar to that shown by pure solutions of quinine and quinidine Slight degrees of fluorescence could be seen only when the test tube was held against a background in a suitable light and not by artificial light Disappearance of fluorescence rather than the absence of a precipitate was considered as marking the limit of sensitivity Because of the slowness with which fluorescence may develop when the alkaloid is present in low concentration observations were made for about ten minutes

The results of the comparison between the two reagents are shown in Table II It was found that in the case of each of the nine alkaloids examined, Valser's reagent permits the detection of the alkaloid in much lower concentration than does Mayer's reagent The relative sensitive

TABLE II —LIMITS OF SENSITIVITY OF MAYER'S AND VALSER'S REAGENTS *

Alkaloid	Lowest Concentration of the Alkaloid Which Can Be Detected by		Relative Sensitiveness of Valser s / Mayer s
	Mayer s Reagent One Part in	Valser s Reagent One Part in	
Atropine sulphate	6,000	43,000	7 2
Cocaine hydrochloride	125,000	600 000	4 8
Codeine phosphate	5,500	43,000	7 8
Morphine sulphate	1,300	7,000	5 4
Nicotine	15,000	225,000	15 0
Pilocarpine hydrochloride	16,000	80,000	5 0
Quinidine sulphate	300,000	1,500,000	5 0
Quinine sulphate	300,000	1,500 000	5 0
Strychnine sulphate	100,000	500,000	5 0

* 5 cc of the alkaloidal solution acidulated with sulphuric acid and 0 5 cc of the reagent were used for each test, except in the case of pilocarpine and atropine which were tested in neutral solution

ness of the former to the latter ranged from about 5 to nearly 8 times, with the exception of nicotine for which Valser s was approximately 15 times as sensitive as Mayer's reagent

III In order to test the effect of dilution of the reagent upon alkaloidal sensitivity, a third reagent, which we shall call the dilute Valser reagent, was prepared by the same method as employed for the Valser reagent, but using a one per cent solution of potassium iodide for titration of the mercuric iodide instead of a 10 per cent solution (W/V) Under these conditions, 10 Gm of potassium iodide (U S P) dissolves only 11 8 Gm of mercuric iodide (U S P) instead of 14 0 Gm The dilute Valser reagent does not contain free iodine On dilution with distilled water, mercuric iodide does not separate out

A comparison was made of the sensitiveness for alkaloids of the dilute Valser reagent with that of the undiluted It was found the ratio of sensitivity of one reagent to the other was not constant for the group of alkaloids named in Table II, thus the alkaloidal sensitivity of Valser's reagent ranged from 1 5 times that of the dilute reagent for quinidine to 6 5 times for nicotine The dilute reagent was in all instances more sensitive for these alkaloids than was Mayer's reagent

Alkaloidal Iodomercurates —The precipitates formed by Mayer's and Valser's reagent with the alkaloids listed in Table II are readily soluble in 10 per cent potassium iodide solution (W/V), dilute ethyl alcohol and tenth normal sodium hydroxide A concentration of alcohol as low as one or two per cent may diminish the sensitivity of the test The precipitates are moderately or readily soluble in concentrated acetic and hydrochloric acids, but much less so in these acids when dilute In dilute sulphuric acid the precipitates appear to be not at all soluble except those of pilocarpine, which is quite soluble in this acid when as dilute as tenth normal, and of atropine, which is moderately soluble The behavior of pilocarpine is peculiar among the alkaloids tested in that its iodomercurate is exceedingly soluble in dilute acetic, hydrochloric and sulphuric acids All the precipitates of this group of alkaloids disappear on heating to boiling or in some instances at a temperature considerably lower than the boiling point

Tanret noted that Mayer's and Valser's reagents yielded precipitates in much lower concentrations of certain of the alkaloidal salts than of the corresponding free bases This observation was confirmed to some exent by the author but the differences were not so striking as those obtained by Tanret It was found that when nicotine base was dissolved in distilled water the limit of sensitivity for Mayer's reagent was about 1 1300 and for Valser's reagent, 1 25,000, whereas in a solution of nicotine sulphate, prepared on the basis of the formula $C_{10}H_{14}N_2\,H_2SO_4$, the limits were 1 3000 and 1 100,000 respectively Solutions of quinine and strychnine bases, however, gave precipitates with both Mayer's and Valser's reagents in only slightly higher con

centrations than did similar solutions of their salts The lower sensitivity of the reagents with nicotine base, as compared with the salt, is probably due to the alkalinity of the solution

Proteins—The behavior of several proteins, namely, egg albumin serum albumin, hemoglobin and gelatin, was studied with the various potassium mercuric iodide reagents described Mayer's, Valser's and the dilute Valser's, the last two of which contain little or no excess of potassium iodide In addition, tests were made with a reagent similar to Mayer's but containing a smaller excess of potassium iodide, prepared according to the formula mercuric chloride 1 358 Gm , potassium iodide 3 422 Gm , distilled water to make 100 cc

Colloidal solutions of the several proteins were prepared in distilled water Precipitation in neutral solution did not occur with any of the potassium mercuric iodide reagents, precipitates appeared only in acidulated solution (sulphuric acid) In the case of each of the proteins, the limit of sensitivity was the same for all four reagents The highest dilution of egg albumin which gave a positive result was approximately 1 70,000, of serum albumin, 1 15,000 of hemoglobin, 1 40,000 and of gelatin, 1 400 000

The protein iodomercurates are difficultly, if at all, soluble in 10 per cent potassium iodide solution, or in ethyl alcohol, and they are intensified on heating, facts which serve to differentiate them sharply from the alkaloidal precipitates The protein precipitates, like those of the alkaloids, dissolve readily on alkalinization with sodium hydroxide

Tanret made the difference in the effect of heat on the alkaloidal and protein precipitates the basis of a method (described above) for the detection of an alkaloid in the presence of albumin Although this method serves for alkaloids in moderately dilute solutions it was found that the process of filtration necessary to remove the albuminoid precipitate markedly reduces the sensitiveness of the test for the alkaloid, probably owing to adsorption

DISCUSSION

There is a lack of agreement regarding the composition of aqueous solutions of potassium mercuric iodide Briefly, it appears that a number of complex iodides may be formed upon the addition of a solution of potassium iodide to mercuric iodide or chloride Five complex salts in all have been reported (25) On the basis of results obtained by a number of investigators, Dawson (26) concluded that when employing dilute solutions of potassium iodide in the preparation of these reagents, the tetraiodide, $2KI\ HgI_2$, is the chief complex salt present, and that as the concentration of potassium iodide is raised and the relative proportion of mercuric iodide in the solution increases, this complex iodide is gradually transformed into one containing a relatively larger amount of mercuric iodide, either $3KI\ 2HgI_2$, or $KI\ HgI_2$ together with equimolar quantities of $2KI\ HgI_2$, probably the former Exception to these conclusions has been taken by Dunningham (27) who calculated that in a 3-component system $KI–HgI_2–H_2O$ at 20° to 30° C , potassium mercuric triiodide, $KHgI_3$, and its hydrate, $KHgI_3\ H_2O$, were the only complex iodides formed Both potassium mercuric triiodide and tetraiodide have been prepared and their properties studied, the former is decomposed by water with precipitation of red mercuric iodide, while the latter is relatively stable (25) On treating mercuric chloride with potassium iodide as in Mayer's reagent, a complex iodide is first formed from which mercuric iodide rapidly separates owing to a secondary reaction with the mercuric chloride (28) The general conclusion is that aqueous solutions of mercuric iodide in potassium iodide contain the complexes $2KI\ HgI_2$ and $3KI\ 2HgI_2$, and that under certain conditions, when using saturated or very concentrated solutions, potassium mercuric triiodide, $KI\ HgI_2$, may also be formed

Two factors in the main seem to influence the sensitivity of the potassium mercuric iodide reagents for alkaloids the presence of an excess of potassium iodide

in which the precipitates are soluble, the nature of the complex iodide, which is determined by the relative amounts and concentration of the reacting salts, and probably by the temperature and a variety of other conditions which have not been adequately determined The fact that on diluting the Valser reagent mercuric iodide precipitates out, whereas on dilution of the relatively dilute Valser reagent (Reagent III) no such precipitate is obtained, suggests the presence in the former of the triiodide, KI HgI_2, and in the latter, of only the more stable tetraiodide, 2KI - HgI_2 That the difference in sensitivity of the undiluted and dilute Valser reagents does not vary uniformly for the alkaloids tested, suggests further that these two complex salts behave differently toward these alkaloids, yielding alkaloidal iodo mercurates with different solubilities

Chemical analyses of the alkaloidal iodomercurates are comparatively rare Fran-ois and Blanc (29) prepared crystalline iodomercurates of eleven alkaloids The majority of these contained one molecule of mercuric iodide in combination with one molecule of the iodohydrate of the alkaloid (HgI_2 Alkaloid HI or 2HI), but three other types were described

Certain differences obtain for the absolute limits of sensitivity of Mayer's and Valser's reagents for alkalo ds as determined by Mayer, Tanret and myself This is not surprising since it is certain that in 1863 Mayer was working with impure preparations of some of the alkaloids, Tanret likewise probably did not have specimens identical with those available at the present time Furthermore, slight differences in the preparation of the reagents, especially in the relative amounts of potassium iodide and mercuric iodide, or chloride, cause considerable variation in sensitiveness When using Mayer's reagent, the relative amounts of the alkaloidal solution and the reagent may also influence the results The degree of acidity of the solutions constitutes another factor In the present investigation, dis appearance of fluorescence rather than absence of a precipitate was used as an end-point in determining the limits of sensitivity, whereas Tanret refers to a "distinct precipitate," a fact which would serve to explain possibly the higher limits of sensitivity obtained by the author with Valser's reagent, but not the lower limits for morphine and nicotine Tanret, nevertheless, found that for the salts of seven alkaloids excluding nicotine, Valser's reagent was on the average 4 5 times as sensi tive as Mayer's reagent, while the author determined the average ratio for the same alkaloids with the addition of quinidine to be 5 6 times

The Valser reagent may prove useful for the quantitative estimation of small quantities of an alkaloid not in perfectly pure solution It may also be possible to determine with relative ease any appreciable decomposition occurring in stock solutions of the alkaloids during a period of time Thus, a solution of codeine sul phate did not alter in its behavior toward the reagent during a period of two months, a solution of morphine sulphate, on the contrary, became markedly more sensitive on standing This would seem to indicate the decomposition or oxidation of the morphine into a compound or compounds detectable in higher dilution by the potassium mercuric iodide reagents than morphine itself

For qualitative use the Valser reagent is to be preferred to Mayer's reagent, for the former yields a positive test in much lower concentrations of the alkaloids than does the latter, and possesses the added advantage that at the same time it is no more sensitive than is Mayer's reagent for certain protein impurities Testing

with both these reagents provides an additional means of distinguishing between the iodomercurates of proteins and those of the alkaloids

SUMMARY AND CONCLUSIONS

1 A potassium mercuric iodide reagent, which closely resembles a reagent described by Valser, the exact formula for which was not available, was prepared by slowly adding a 10 per cent (W/V) solution of potassium iodide to red mercuric iodide until the mercuric iodide was just completely dissolved Under these conditions, 10 Gm of potassium iodide made up to 100 cc in distilled water dissolves approximately 14 0 Gm of mercuric iodide at 20° C

2 The Valser reagent is much superior to the widely used Mayer's reagent as a qualitative test solution for alkaloids For the nine alkaloids tested in pure solution, the former reagent was found to be from 4 8 to 15 0 times as sensitive as the latter

3 The alkaloids investigated yielded a positive test with the Valser reagent in concentrations which ranged from approximately 1 7000 for morphine sulphate to 1 1,500,000 for the sulphates of quinine and quinidine

4 Each of several proteins, which in low concentrations also form precipitates in the potassium mercuric iodide solutions, possesses virtually the same limit of sensitivity with all these reagents prepared regardless of their concentration or the presence of an excess of potassium iodide Thus Valser's reagent was not more sensitive than Mayer's reagent for any of the proteins tested

5 Attention is directed to the variability in the individual behavior of the alkaloids with solutions of potassium mercuric iodide For example, the exceptional solubility of the iodomercurate of pilocarpine in dilute sulphuric acid (tenth normal) is pointed out, whereas the solubility of the iodomercurate of nicotine diminishes on acidulation with sulphuric acid

6 Certain differences are noted between the properties of the iodomercurates of the alkaloids and those of the proteins investigated

7 Factors which may influence the sensitivity of the potassium mercuric iodide reagents with alkaloids are discussed, and the literature regarding their use as precipitating reagents for alkaloids is reviewed

REFERENCES

(1) F L Winckler, "Uber Prufung der Chinarinden Bestimmung des Brucingehalts in der falschen Angusturarinde, Mannit in der Papellsalbe" *Repertorium f d Pharmacie*, 51 (1835), 369–373

(2) F L Winckler *Ibid*, 35 (1830) 57 (Cited by Tanret (21) *)

(3) F F Mayer Some Remarks on a Systematic Quantitative Testing of Alkaloids," PROC A PH A 10 (1862) 238–241

(4) A B Prescott, Estimation of Alkaloids by Potassium Mercuric Iodide," *Chem News*, 45 (1882), 114–115, 123–125

(5) W Delfs, Neues Jahrbuch f Pharm "2 (1854) 31 (Cited by Tanret (21) *)

(6) J Nessler 'Verhalten des Iodoquecksilbers zu Ammoniak und eine neue Reaktion auf Ammoniak," *Arch Pharm* 90 (2nd series) (1857) 172–182

(7) J E de Vrij and E A Van der Burg, Detection of Strychnine in Cases of Poisoning," *Pharm J and Trans* 16 (1857) 448–452

* Reference not available in the New York Academy of Medicine nor in the New York College of Pharmacy

(8) T B Groves, On Some Compounds of Iodide and Bromide of Mercury with the Alkaloids," *Ibid*, 18 (1858), 181–182, or *J Chem Soc*, 11 (1859), 97–102

(9) A Valser, Thesis, Paris, 1862 (Cited by Tanret (21) *)

(10) Report of Committee on Prize Essay for 1862, *J pharm chim*, 43 (3rd series), (1863) 34–55

(11) A Valser, Abstract, PROC A PH A, 11 (1863), 168

(12) A Valser, Abstract, *Z anal Chem*, 2 (1863), 79

(13) A Valser, Abstract, *Repertoire de Chimie, pure et appliqué*, 4 (1862), 460–461

(14) F F Mayer, Abstract, PROC A PH A, 11 (1863), 167–168

(15) United States Pharmacopœia, Tenth Revision (1926), 490

(16) F F Mayer, "On the Assay of Alkaloids, Pure and in Preparations" *Chem News*, 7 (1863), 159–161

(17) F F Mayer, Assay of Opium and Its Preparations," *Ibid*, 8 (1863), 177–179 189–190

(18) F F Mayer, On the Active Principles of the Strychnaceæ," PROC A PH A, 11 (1863), 248–253

(19) C Tanret, Thesis, de l'Albumine, Paris (1872) (Cited by Tanret (21) *)

(20) P B Hawk and O Bergeim, *Practical Physiological Chemistry*, 147 (1931), (Tenth Edition)

(21) C Tanret, 'Etude sur les réactifs à base d'iodomercurate de potassium et l'iodure ioduré de potassium," *J pharm chim*, 28 (5th series), (1893), 433–441, 490–500

(22) J C Munch, F C Crossley and W H Hartung, "Alkaloidal Reagents I Introduction," JOUR A PH A, 20 (1931), 1037–1041

(23) C C Fulton, 'The Precipitating Agents for Alkaloids," *Am J Pharm*, 104 (1932) 244–271

(24) British Pharmacopœia (1932) 505
Codex Medicamentarius—Pharmacopée Francaise (1927), 851
Deutsches Arzneibuch (1926), 770
Nederlandsche Pharmacopée (1926), 570
Farmacopea Română (1926), 508
Farmacopea Ufficiale del Regno d'Italia (1920), 375

(25) J W Mellor, "A Comprehensive Treatise on Inorganic and Theoretical Chemistry" 4 (1929), 925–933

(26) H M Dawson, "Dissociation Equilibria in Solutions and Its Application to the Study of Aqueous Potassium Mercuri iodide Solutions," *J Chem Soc* 95 (1909) 870–878

(27) A C Dunningham, 'The System Ethyl Ether–Water–Potassium Iodide–Mercuric Iodide," Part I The Underlying Three Component Systems" *J Chem Soc*, 106 (1914), 368–379

(28) F Auerbach and W Plüddemann, 'Massanalytische Bestimmung von Ameisen saure und ihre Salzen" *Arb kais Gesund Amte* 30 (1909), 178–194

(29) M François and L G Blanc 'Methode de preparation des iodomercurates d' alcaloides à l'état crystallize," *Bull soc chim* 31 (4th series), (1922), 1208–1216, 1304–1314

DEPARTMENT OF PHARMACOLOGY
CORNELL UNIVERSITY MEDICAL COLLEGE
NEW YORK CITY

VEHICLES FOR MEDICINES *

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

VI SYRUP OF CINNAMON

Syrup of cinnamon has been recommended as an "almost specific" vehicle for salicylates As the syrup of cinnamon has a brown color, its use would coincide

* From the Laboratory of Pharmacology University of Illinois, College of Medicine, and assisted by a grant from the AMERICAN PHARMACEUTICAL ASSOCIATION

with the idea expressed by Lucas and Henderson,[1] to use colored vehicles, such as syrup of glycyrrhiza or compound syrup of sarsaparilla, for salicylates in order to make the discoloration that salicylate undergoes on keeping, less obvious to the patients

Dissolving 0 30 Gm of sodium salicylate in 4 cc of syrup of cinnamon yields a preparation that is disappointedly disagreeable to our taste As the syrup of cinnamon itself has an astringent and somewhat acrid taste, the disagreeableness may be due to the tannin and cinnamic acid present in the cinnamon, for the syrup is prepared by extraction of the cinnamon with alcohol (almost 10%) in cinnamon water We have noticed that the presence of even a small quantity of acid brings on an acridity in salicylate solutions, presumably due to liberation of salicylate ions

Inasmuch as this syrup is merely intended as a flavoring vehicle, it may well be questioned why we should make this preparation from the drug itself, and include various undesirable, because disagreeably tasting, ingredients, when the oil of cinnamon represents the cinnamon flavor so fully

EXPERIMENTS ON FLAVORING A SYRUP

We therefore set about to experiment on the question of preparing a syrup directly from the oil itself, starting with cinnamon water, and using it in the percolation of the sugar (*Process 1*)

Cinnamon Water	450 0 cc
Sucrose	850 0 Gm

Percolate until 1000 cc of the syrup are obtained This results in a clear rather mildly cinnamon flavored syrup

With the hope of increasing the strength of the preparation and saving the clarification of the cinnamon water by filtration through absorbent material, we shook up oil of cassia with water and percolated the sugar with this mixture (*Process 2*)

Oil of Cassia	1 0 cc
Distilled Water	450 0 cc
Mix by vigorous agitation and percolate through Sucrose	850 0 Gm
until 1000 cc of the syrup are obtained	

The resulting syrup is slightly opalescent, but practically clear, and of stronger flavor than that resulting from Process 1, and of pleasantly burning taste

To determine whether we might introduce a still larger quantity of cinnamon oil into the syrup by better subdivision of the oil of cassia, we triturated the sugar with the volatile oil and percolated with water (*Process 3*)

Oil of Cassia	1 0 cc
Sucrose	850 0 Gm
Triturate thoroughly and percolate with Distilled Water	450 0 cc
until 1000 cc of the syrup are obtained	

This yielded a decidedly turbid fluid of rather strong cinnamon flavor and taste By reducing the oil of cassia to one-fourth the amount that is employed in the preparation of cinnamon water and distributing this oil over sucrose, we secured a preparation practically identical in appearance, odor and taste with that yielded by Process 2 It is obvious, therefore, that Process 3 is more economical in

[1] *Canadian Medical Journal*, April 1931

the use of the oil of cassia than are any of the previously enumerated processes, obviously because of the presenting of a larger surface of the volatile oil to the solvent than in the other methods

In an attempt to possibly still further increase the cinnamon content of the preparation—though this seems hardly necessary—we dissolved the oil of cassia in a small proportion (5%) of alcohol and distributed the alcoholic solution over the sugar which was then submitted to percolation with water in the preparation of the syrup (*Process 4*)

Oil of Cassia	1 0 cc
Alcohol	50 0 cc
Triturate this thoroughly with Sucrose	850 0 Gm

Then percolate with Distilled Water until 1000 cc of the syrup are obtained

The result is surprising in that odor as well as taste are less prominent than in the syrups resulting in Processes 2 and 3

In view of the above-stated facts, it is an interesting question as to what happens to the oil of cassia used in the various processes In Process 1, in which cinnamon water was employed, the large excess of oil that was used was filtered out, being left in the absorbent material In Process 2, in which the oil was shaken with the water, crude oil droplets were found on the walls of the funnel and on the cotton plug as could be clearly demonstrated by means of Sudan III Process 3 secures better subdivision and distribution and therefore enables one to obtain identical results with those of Process 2 with the use of a smaller proportion of oil In Process 4, there can be no doubt that a larger proportion of oil is in solution, for we are dealing with a better solvent and there certainly must be less loss of oil than in any of the previous processes, and yet the product appears to our senses decidedly weaker The answer as to the reason for this remarkable discrepancy in results is probably to be found in the physical fact that a substance will not exchange a good solvent for a poor solvent Hence, the oil of cassia is "disguised" better, *i e*, less prominent to odor and taste than it would be were it to find itself in supersaturated solution in a poorer solvent

We, therefore, recommend consideration of the following formula for the syrup of cinnamon of the forthcoming National Formulary

SYRUPUS CINNAMOMI

Syrup of Cinnamon

Syr Cinnam

Oil of Cassia	0 5 cc
Compound Tincture of Cudbear	60 0 cc
Sucrose	850 0 Gm
Water, a sufficient quantity	
To make	1000 0 cc

Distribute the oil of cassia over the sucrose by trituration in a mortar and percolate with 390 cc of water to which the compound tincture of cudbear has been previously added Percolate until 1000 cc of syrup are obtained

PRESCRIPTION FOR SALICYLATE

When we use the syrup thus prepared as a vehicle for salicylate with the addition of alkali, there is possibly a diminution of the cinnamon flavor of the syrup

by the addition of the just sufficient quantity of water to dissolve the salicylate and the alkali which should guard the salicylate against precipitation in the form of salicylic acid by the acid of the gastric juice The following prescription might, therefore, be recommended potassium bicarbonate having been chosen in preference over sodium bicarbonate because of its greater solubility in water

℞	Sodium Salicylate	10 0 Gm
	Potassium Bicarbonate	10 0 Gm
	Cinnamon Water	60 0 cc
	Syrup of Cinnamon, enough to make	120 0 cc

Mix and label Teaspoonful in glassful of seltzer water every two hours

One advantage of using the cinnamon syrup instead of colorless syrups is that the discoloration salicylate undergoes on standing is thereby rendered unnoticeable

IRON IN CINNAMON SYRUP

Another advantage of our synthetic formula for syrup of cinnamon is that it could be used as a vehicle for iron salts, while the syrup at present official in the N F is out of the question for this purpose, because of "ink" formation The following formula yields an actually delicious clear preparation

℞	Iron and Ammonium Citrate	10 0 Gm
	Water	10 0 cc
	Syrup of Cinnamon (made from Oil of Cassia) to make	120 0 cc

Mix and label Teaspoonful in water three times a day after meals

This would yield the average medicinal dose per teaspoonful In view, however, of the much larger doses favored by clinicians, a tablespoonful, which might carry 1 5 Gm of the medicament, would be more likely to produce striking results

---

DRUG STORE LOCATION *

BY I K ROLPH [1]

Perhaps no kind of retail business is more sensitive to good or faulty location than the drug store This is largely because the drug store, more than any other kind of store with a city-wide distribution, enters into competition with a great many other kinds of stores and because it is dependent, to varying degrees, upon both transient and resident patronage

TYPES OF LOCATIONS DEFINED

There may be said to be five different types of retail locations, irrespective of kind of business These five types of locations, each with its own definite characteristics, are Central shopping district location, sub-center location, neighborhood location, string-street location and the "not concentrated" location It is obvious that these location types are in relation to the retail structure of a city and, for that reason, are applicable to any large city (Figure 1) Further, because of

* Section on Commercial Interests A PH A, Washington meeting 1934

[1] Research Specialist, Bureau of Foreign and Domestic Commerce

the diffused distribution of drug stores, we find drug stores represented at every one of these locations (Table I)

TABLE I —THE RETAIL DRUG PATTERN

Locations	ST LOUIS Per Cent of Drug Stores Represented	ST LOUIS Per Cent of Drug Sales Represented	ST LOUIS Average Annual Sales per Store	BALTIMORE Per Cent of Drug Stores Represented	BALTIMORE Per Cent of Drug Sales Represented	BALTIMORE Average Annual Sales per Store
Total	100 0	100 0	$ 30,252	100 0	100 0	$ 30,000
Central shopping district	3 5	15 0	127,346	5 0	24 1	143 000
Uptown shopping district	1 6	4 8	88 338			
Sub centers	20 4	26 6	39,558	18 3	24 7	40,500
String streets	13 3	10 3	23,466	7 4	7 8	32 000
Neighborhood developments and not concentrated	61 2	43 3	21 585	69 3	43 4	19 500

The central shopping district location is obviously within a city's central shopping district—the heart of the business district The tendency in every city, outside of the heart of it, is for the population to group itself into communities Some communities are, of course, more clearly defined than others Sub-centers are the business centers of these urban communities As a city may be said to be composed of a number of communities, so each community may be said to be composed of a number of neighborhoods And neighborhood business reflects that part of the community in which it is located, and is governed, to an even greater degree, by the same considerations that govern the sub-center String-street locations are those business sites strung along a street, on one or both sides, for a considerable distance Business is not a definite part of the community around it, but rather draws its patronage from those persons using the street "Not concentrated" business is that business which is scattered without relation to any retail development It is business which stands alone, and may occur in any part of the city

TABLE II —THE CENTRAL SHOPPING DISTRICT IN THREE METROPOLITAN COMMUNITIES

	BALTIMORE	PITTSBURGH	ST LOUIS
Area of district in square miles	0 14	0 21	0 15
Per cent of city's stores represented	6 10	11 00	5 00
Per cent of city's sales represented	28 10	47 00	32 00
Average annual sales per store	$143 190	$210 000	$249 000
Per cent of sales done in this district by			
General merchandise stores	38 0	49 0	51 0
Apparel stores	19 5	14 0	18 0
Furniture and household stores	9 5	11 0	11 0
Jewelry stores	4 3	3 0	3 0
Automotive establishments	0 3	1 0	1 0
Restaurants and other eating places	4 2	4 0	4 0
Lumber and building establishments	2 9	1 0	0 3
Food stores	2 4	7 0	1 0
Drug stores	2 9	2 0	1 7
Other retail stores	16 0	8 0	9 0
Per cent of sales done in this district by			
Independent stores	64 1	59 0	72 0
Local chains	3 5	4 0	2 0
Sectional chains	15 7	10 0	4 0
National chains	10 9	26 0	19 0
Other types	5 8	1 0	3 0

THE CENTRAL SHOPPING DISTRICT LOCATION

The proportion of a city's drug store business done at central shopping district locations is between 15 and 25 per cent, if St Louis and Baltimore can be considered fairly typical of a metropolitan community And these amounts of business are carried by about 4 or 5 per cent of the total drug stores in the city (Table I) In relation to central shopping district business as a whole, drug stores do from 1 7 per cent to 2 9 per cent of all business in that district (Table II)

Since business in this district is entirely dependent upon transient patronage, accessibility is the chief consideration in choosing a site If accessibility is the chief consideration, then the amount of traffic that passes a location is important In connection with the National Drug Store Survey conducted in St Louis, the amount of traffic passing eight drug stores in the central shopping district was analyzed and compared with the net sales of these same stores By correlating this information with the rent paid, it was possible to determine the cost of rent for every 100 persons passing each site and the average sales derived from every 100 passersby

This analysis showed that these eight drug stores paid in rent all the way from 12 cents to 38 cents for every 100 persons that passed, and made sales of from $1 53

TABLE III —AN ANALYSIS OF EIGHT ACTUAL DRUG STORE SITES (ST LOUIS)

Site Number	Average Day s Traffic	Per Cent Rating on Basis of Traffic Flow	Sales Derived from Every 100 Persons Passing Store (Relation of Traffic to Sales)	Rent Cost for Every 100 Persons Passing Store (Relation of Traffic to Rent)	Per Cent Relation of Rent to Net Sales
1	37,000	100 00	$2 95	$0 38	12 7
2	32,500	87 84	2 62	0 12	13 1
3	30,000	81 08	3 38	0 28	8 4
4	22,000	59 46	2 15	0 31	4 7
5	21,000	56 76	3 94	0 33	16 6
6	20,000	54 05	1 53	0 25	14 7
7	17,500	47 29	4 59	0 24	5 2
8	11,000	27 73	2 31	0 30	8 2

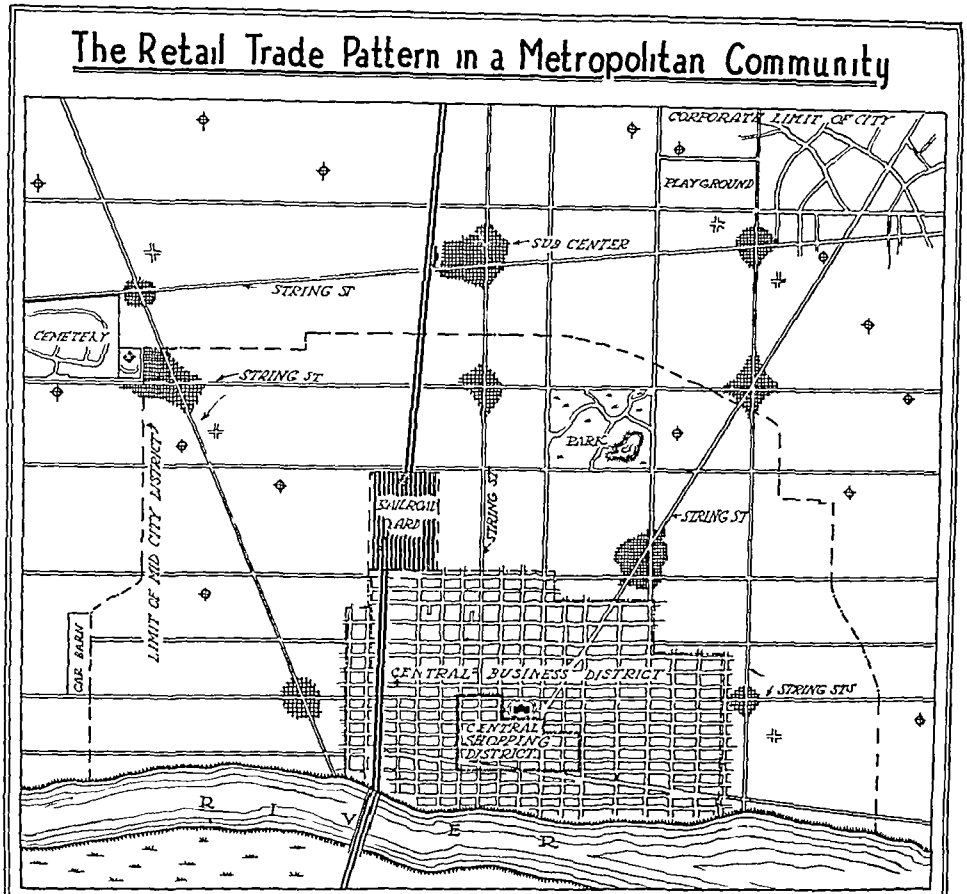
to $4 59 per 100 persons Table III gives the results of this analysis, with the sites arranged in the order of the volume of the average day's traffic

It may be seen that at those points where traffic is heaviest, traffic is not always of the greatest value In fact, the second lowest amount of daily traffic (17,500 persons) shows the greatest sales per 100 persons, and at a rent cost of only 24 cents per 100 persons passing

It is thus indicated that not only is traffic as such an unreliable measure of potential business unless related to the character of traffic, but that rent is also an unstable factor, frequently unrelated to the value of the traffic or the actual amount of business which such a site can produce

In connection with drug store rentals at central shopping district locations, you may be interested in learning about other drug store operating costs at these same locations contrasted with drug store operating costs at all other locations in the city Such a study has just been made in the Bureau of Foreign and Domestic Commerce It was based upon the Census of Retail Distribution, taken in St Louis, although it is not a part of the National Drug Store Survey

Salaries paid employees amounted to 12 2 per cent of sales in central shopping district drug stores, and 12 4 per cent of sales in drug stores located elsewhere



Types of Retail Business Development & Factors Determining their Growth

Factors of Influence	Central Shopping District	Sub Centers		String Streets		Neighborhood Groups		Not Concentrated locations	
		Mid-city	Outlying	Mid-city	Outlying	Mid-city	Outlying	Mid-city	Outlying
Present Population Density	Very Low	High	Medium	High	Medium	High	Low or Med	High	Low or Med
Patronage	City's Trading Area	Local & Transient	Mainly Local	Either Mainly Local or Mainly Transient		Local		Mainly Transient	
Income of Patronage	Income of Trade Area	Med. Low	Med to High	Low or Med. or High		Very Low to High		Low to High	
Racial Composition of Patronage	Race has been & will be Evident	White or Foreign or Negro	Usually Native White Americans	White or Foreign or Negro		White or Foreign or Negro		White or Foreign or Negro	
Transportation Facilities	Center of all Rail lines	Important street Car Intersection	Important street Car Intersection	Main thoroughfare for Auto or Auto and Street Car traffic		Usually None	Usually None	Usually a Main Thoroughfare for Auto Traffic	
Trade Barriers	Usually None	Usually None	May be one or More	Usually None	May be one or More	Usually None	May be one or More	Usually None	May be one or More

Fig 1—A typical urban community showing examples of its retail business developments together with a list of factors determining their character and growth

in the city Actual rent amounted to 7 1 per cent of sales in central shopping district drug stores, and 5 9 per cent of sales in stores elsewhere Other expenses amounted to 5 4 per cent of sales in central shopping district drug stores, and 5 6 per cent of sales in stores elsewhere Including a wage-compensation to owners (the average salary paid to employees and imputed to all owners who were reported as working in their stores), the total operating expense amounted to 24 8 per cent of sales for drug stores at central shopping district locations and 26 7 per cent of sales for drug stores at locations elsewhere in the city

It is interesting to know that 70 kinds of retail business were found to have locations both in the central shopping district and outside Of these 70 kinds of business, 37 were found to have lower total operating-expense ratios when located in the central shopping district than when those same kinds of business were located outside The remaining 33 businesses had, of course, higher total operating expenses when located in the central shopping district than when located outside The drug store is one of the 37 businesses whose total operating-expense ratio is lower (to the extent of 2 points) at central shopping district locations However, it is well to remember that the expense ratio for stores outside of the central shopping district represents an average ratio for all stores at four types of locations (the sub-center, the neighborhood, the string-street and the not-concentrated locations), while the central shopping district ratio is for stores at one type of location only, namely, the central shopping district location

Continuing with an analysis of expense ratios in the central shopping district, the above-average-sales stores were separated from the below-average-sales stores The average sales per drug store in the central shopping district were found to be $127,346, and six stores were found to have sales above that amount and 15 stores were found to have sales below The total operating-expense ratio for those six stores with above-average sales was found to be 22 9 per cent, and the ratio for the 15 stores with below-average sales was found to be 28 8 per cent—a 6 point difference To quote from this study—"The drug store reacts more consistently than any other kind of business in feeling the effect of increased sales Actual-rent, employee-salary and other-expense ratios vary in similar degrees, as sales go above or below average, resulting in the same consistent differences in total operating-expense ratios" Perhaps I should state that while the average sales for all drug stores in the central shopping district were $127,346, the average sales for those stores with above average sales were $303,541, and the average sales for those stores with below-average sales were $56,868

THE SUB-CENTER LOCATION

The second most important type of drug site is the sub center location If the two cities (Baltimore and St Louis) constitute an adequate sample, so that between 4 and 5 per cent of a city's drug stores are in the central shopping district, it is probably true that about 20 per cent of the drug stores are located in sub-centers (Table I) And it is undoubtedly the second ranking location type for a drug store, from the point of view of volume of business Volume depends further, however, upon the income area in which the sub center is located

Accessibility to the people of that community, which is largely determined by transportation facilities, is, of course, as much of a factor in sub-center location as

accessibility to the city as a whole is in central shopping district location And accessibility appears to be more correctly expressed in rent as related to sales at these locations than at central shopping district locations An analysis of rent-to-sales percentages at a considerable number of sub-center locations has revealed, generally, a small range due largely to the fact that actual value of these locations is an easier matter of judgment The survey in St Louis showed that the rent-to-sales percentages at sub-center locations there were almost 4 points lower than at central shopping district locations And those 4 points may be a contribution to net profit

A higher selectivity of locations is available, also, when selecting a sub-center site, for there are always many sub-centers in any one city, as against only one central shopping district Further, since sub-centers reflect very closely the income of the communities in which they are located, the volume of business one aims to do can be more closely related to a sub-center site than to any other type of site Also, the kind of people one wishes to serve, which is expressed in racial background and occupations as well as income, determining the kind and quality of stock to be carried, may frequently be selected at sub-center sites The population density of a community determines, in part, the stock turnover and volume

THE NEIGHBORHOOD LOCATION

Closely related to sub-center location is neighborhood location Neighborhood drug business reflects the income of the people living in those neighborhoods to the same degree that sub-center drug business reflects the income of the people living in sub center communities, which, after all, are simply the larger units of which the neighborhoods are part

There is even a higher selectivity of locations available among neighborhood sites And because it is a small part of a larger unit, a store at such a site is almost entirely dependent on the people immediately surrounding it While stores here do not offer such high volumes (the average is probably about $20,000, as shown in Table I), they can be very profitable if they are located in the right neighborhoods

The St Louis survey found that the rent-to-sales percentages at neighborhood locations were higher than at sub center locations Actual rentals were not higher but apparently they were out of proportion to the volume of business possible at those locations In some instances, it has been known that landlords take advantage of the possibility that the neighborhood may become a sub-center later on, and so charge accordingly It is believed better to pay a rental based on to-day's volume and a higher rental as the district develops rather than to speculate on the future of a district and pay on that basis The landlord rather than the merchant should do the speculating

THE STRING-STREET AND NOT-CONCENTRATED LOCATIONS

The opportunities for drug store business are less at string-street and not-concentrated locations than at any other location types (Table I) Their chief weakness is due to the fact that they lack a business focal point, and so are difficult locations at which to carry on a drug business Instances of considerable success are few and are accomplished only by exerting more than ordinary effort Usually

these locations cater only to a small and limited number of drug patrons and fill emergency needs rather than general drug needs

SUMMARY

The possibilities of drug business at locations outside the central shopping district may be said to be in this order Sub-center, neighborhood development, string-street development and the "not concentrated"

In choosing a central shopping district location, it should be borne in mind that the drug business at these locations accounts for less than one-fourth of all the drug business within the city limits, that character as well as amount of traffic should be considered in appraising a site's accessibility, and that rent also should be related as closely as possible to the actual amount of business which such a site can produce

From an accumulation of figures, over a period of time and in a number of cities, it appears that drug stores located in sub-centers have the most desirable operating figures and characteristics Sub-centers, generally, provide a high selectivity of profitable drug locations

Both the sub-center and neighborhood locations are greatly influenced by the income of the population around them The string-street location is greatly influenced by the character of traffic that uses the street and the degree and kind of business specialization that may exist there

In general, five factors determine the selection of any profitable drug store location *First*, it must be accessible to a sufficient number of people, either transient or resident patronage, or both Resident patronage can be estimated by knowing the population of the shopping area to be served If it is transient patronage, either partly or wholly, it is necessary to be assured of accessibility by street car, bus or automobile *Second*, the people within that shopping area must have sufficient purchasing power *Third*, if the racial composition or background of the people is conspicuous, it should be known so as to determine the kind and quality of stock to be carried In the case of a chain store, the selection of a manager may even be influenced by such knowledge *Fourth*, it is necessary to know the availability of transportation facilities, in all cases except where the patronage lives immediately around the store, as at the neighborhood location And transportation facilities may be misleading unless the character of traffic is considered along with number of persons A *fifth* factor is topography or other trade barriers (natural or artificial), which in residential areas, particularly, affect the limits of a shopping district It is believed that these five factors can be more correctly applied if thought of in terms of the structure of the entire city

---

ELECTIONS OF NATIONAL ACADEMY OF SCIENCES

At the meeting of the National Academy of Sciences held in Washington on April 23rd, 24th and 25th, Dr Thomas Hunt Morgan, director of the William G Kerckhoff Laboratories of the Biological Sciences of the California Institute of Technology and past-president of the academy, was elected foreign secretary to succeed Dr Robert A Millikan, director of the Norman Bridge Laboratory of Physics and chairman of the Executive Council of the California Institute of Technology, who asked to be relieved of the office, which he has held for the past fifteen years Dr Roger Adams, professor of organic chemistry at the University of Illinois, and Dr H S Jennings, professor of zoölogy at the Johns Hopkins University were elected members of the council —*Science*, May 4, 1934

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note Recently a state board member complained to me because as he said "No matter how simple a question I may ask about products of the National Formulary, I find that graduates have difficulty in answering it." We must recognize the fact brought out so well by Dr W J Husa in the paper which follows that the National Formulary is coming into use more and more and therefore we must see to it that our students are familiar with it and appreciate its value in the conduct of their drug stores Dr Husa's paper is timely and practical—C B JORDAN, *Editor*

THE NECESSITY FOR INCREASING EMPHASIS ON THE N F IN PHARMACY COURSES

BY WILLIAM J HUSA *

In pharmaceutical education, the United States Pharmacopœia has traditionally received greater emphasis than has been accorded to the National Formulary Forty years ago, the U S P, with its prestige based on seven decades of useful service, must have towered above the embryonic N F in the minds of pharmacists However, with the passing of the years, the N F increasingly justified its existence, and in 1906 the Federal Food and Drugs Act made it a legal standard, thus placing it on a par with the U S P in legal standing

In any comparison of the U S P and N F it is necessary to consider the fundamental distinction between the two books, which is that the U S P admits drugs on the basis of therapeutic usefulness, and aims to keep at a minimum the pharmaceutical preparations of these drugs, while the N F is essentially a book of pharmaceutical formulas, selected on the basis of their use by physicians but with no indorsement of their therapeutic worth, this being left to the judgment of the individual physician

As pharmaceutical educators, it is worth our while to consider where the difference in scope between the U S P and N F is leading us, and to give thought to other developments which seem to call for a revision of the content of our pharmacy courses

The changes which have been taking place with successive revisions of the U S P are reflected in the statement of a prominent retail pharmacist, who said that in his earlier experience, four or five copies of each revision of the U S P were worn out by use in his store, while more recently one copy has lasted more than ten years On the other hand, in recent years, many pharmacists have been saying that they use the N F a great deal more than the U S P We see here a definite trend which merits the thoughtful attention of every teacher of pharmacy

The reasons for the fact that many retail pharmacists are using the N F more than the U S P are not far to seek In the first place, by steadily pursuing the declared policy of keeping pharmaceutical preparations at a minimum, the U S P is becoming more and more a book of standards for individual drugs, and is thus

* University of Florida

naturally of more direct usefulness to manufacturers and enforcement officials than to retailers Furthermore the complexion of the list of drugs is changing, with the inclusion of increasing numbers of synthetics and biologicals, which require less compounding on the part of the pharmacist, so that there is less frequent necessity for referring to the U S P Then there is the spirit of therapeutic nihilism driving many drugs and preparations from the U S P, it being easier to superciliously throw a drug overboard than to study out the exact conditions of successful use which led to its reputation Some authorities think that too much emphasis has been placed on pharmacological methods in matters of deletion of drugs For example, it may not be possible to demonstrate the effect of an antipyretic on a dog of normal temperature The fact that a drug has been found useful by generations of practicing physicians should carry due weight Let us remember that chaulmoogra oil was used for leprosy for centuries before its value was demonstrated in a scientific way, and that burnt sponge, which contains iodides from sea water, was used in cases of goiter for a thousand years before iodine was recognized as an element Cod Liver Oil was used empirically for generations before vitamins were discovered, meanwhile bearing the brunt of much criticism to the effect that it was no better than other fats

With these changes in the U S P the types of preparations which can be made by the pharmacist have been shifting to the N F For example, there are two elixirs in the U S P and 65 elixirs in the N F, there are 3 emulsions in the U S P and 5 in the N F, of fluidextracts, we find 26 in the U S P and 104 in the N F, of liniments there are 5 in the U S P and 10 in the N F, of solutions there are 23 in the U S P and 37 in the N F, of mixtures there are 2 in the U S P and 13 in the N F, of ointments there are 18 in the U S P and 19 in the N F, of syrups there are 18 in the U S P and 37 in the N F, of tinctures there are 40 in the U S P and 55 in the N F, etc The N F also contains many other types of preparations such as petroxolins, sprays, mulls, oleates, dermatologic pastes, dental preparations, veterinary preparations, etc The presence of the various preparations in the N F is based on extensive surveys showing the extent of use of all items by physicians of the U S The group of N F preparations might thus be thought of as an All American selection, chosen by the physicians of the nation, the vote being the truest possible one, that of actual use

It is thus easy to understand the increasing use of the N F by pharmacists In bringing N F preparations to the attention of his local physicians, the pharmacist is thus making available to them the preparations found most useful by physicians of the U S

However, the policy of basing admission to the N F on the extent of use has a very serious drawback According to a line of reasoning now popular in pharmaceutical circles, when Edison was about to construct the first electric light plant, he should have made a survey of the country, which would have shown that there were no electric light plants in use, therefore he should have concluded that he should not start one

There should be a place in the N F for new preparations which should be introduced, featured and used in the same manner that new proprietaries or specialties are launched, otherwise the N F will stagnate Research should be sponsored on new preparations, new combinations incorporating modern scientific

medical ideas These products should be subjected to thorough pharmacological and clinical tests

Although the N F does not take the responsibility of indorsing the therapeutic value of its items, this policy should not deter the pharmacist from detailing the physicians with N F preparations, since we need only recall that the N F contains preparations of such drugs as the cinchona alkaloids, the bromides, strychnine, cod liver oil, cascara sagrada, iron, salicylates, senna, belladonna, santonin, ipecac, opium, digitalis, calomel and many other preparations containing drugs of unquestioned therapeutic value presented in combinations which have been found useful by physicians

The increasing use of the N F by pharmacists makes it necessary that we place increasing emphasis on the N F in our pharmacy courses Our conference here to-day gives us the opportunity of exchanging ideas regarding methods of teaching and content of courses which will place proper emphasis on the N F Our teaching could well be aimed to inspire some constructive thought on the part of the students, so that they will view the N F as a living, growing project which is theirs to use and to develop to an ever-increasing extent in the upbuilding of the profession of pharmacy in its service to humanity

---

EXTRACTS FROM THE SUMMARY OF PROCEEDINGS OF THE 1934 MEETING OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

The 35th annual meeting of the American Association of Colleges of Pharmacy was held May 7th and 8th Eighty six delegates from forty four member colleges were in attendance

Dean Theodore J Bradley presented a memorial on the death of Prof Florin J Amrhein

The address of President L D Havenhill is printed in the May number on pages 462 to 470

Secretary-Treasurer Zada M Cooper reported a membership of fifty seven colleges with one in arrears for dues A second series of visits to member colleges was completed early in the year

Cash on hand amounted to $1233 58 The report was accepted and an Auditing Committee appointed

Chairman C B Jordan of the Executive Committee submitted the following relative to fifty five colleges reporting The total number of entrants for 1933–1934 was 1902, the number of High School graduates, 1894, the number of special students, 8, the number that had previous college training 500 This report shows an increase of 7% over that of 1932 to 1933, the number of students having previous college training increased 3%, the total by 26 3% of all entering students

The report contained the following recommendations, which were adopted

(1) That a committee of three be appointed to cooperate with similar committees of the N A B P and the A Ph A to assist in straightening out code matters

(2) That credits earned in a standard college, one recognized by the state educational department or by the state university in which it is located, may be accepted for face value in a college of pharmacy in so far as such work applies in the course in pharmacy, but, regardless of amount of credit offered, no student will be permitted to complete the course in pharmacy in less than two collegiate years This recommendation was made a part of Paragraph 3 of Article VII of the by-laws

(3) That the Association request the American Council on Pharmaceutical Education to proceed without further delay to perform the functions for which it was created and that the secretary inform the President of the American Council on Pharmaceutical Education of this request

(4) The American Association of Colleges of Pharmacy is vitally interested in any attempt to improve the control of the sale and the advertisement of food, drugs and cosmetics, and it goes on record as highly in favor of legislation that will properly protect the public against the advertisement or sale of fraudulent, misrepresented poisonous or deleterious food, drugs or cosmetics

(5) That this Association goes on record as favoring Amended Senate Bill 2800 as reported by the Senate Committee on Commerce on March 15, 1934, or a bill of equal or greater merit

A resolution, relative to ideal qualifications for deans, which had been referred to the Executive Committee was considered and the following recommendation made and adopted

That the Executive Committee does not approve of the recommendation as written and recommends that it be referred to the American Council on Pharmaceutical Education for further study

In a supplementary report, Dean Jordan presented a request for the Conference of Teachers of Pharmacognosy and Pharmacology that the Executive Committee recommend the appointment of a committee to study the conditions effecting the study of Botany This was adopted and the committee appointed

Chairman J G Beard reported for the Syllabus Committee He directed attention to the fact that there is less unanimity of opinion about the subject matter of pharmaceutical education than of any other type of organized education

Dean R A Lyman presented a paper, "The American Association of Colleges of Pharmacy in Its Relation to the American Council on Education" He recommended the appointment of a Problems and Plans Committee as a standing committee of the Association whose function it will be to study the problems which most concern pharmaceutical education and work out plans for comparative research of a pharmaceutical and educational nature The report was adopted

Dean Ernest Little reported for the Committee on Qualifications for Admission to Membership in the Association Dean Little reported that the Committee had been out of work for three years, that last year a report had been submitted and the entire session had been given to its discussion The report was accepted and a copy sent to each member college The report was submitted and voted upon paragraph by paragraph, and adopted

Prof Charles Stocking reported for the Committee on Educational Standards, Prof A B Nichols for the Committee on Activities of Students and Alumni Prof Schlicting, through Dr C E Caspari reported for the Committee on Relations of Boards and Colleges

The report of the Committee on Student Branches of the A Ph A, by George L Webster, was read by Dr W F Rudd

The report of the Committee to study the list of crude drugs prepared by District No 2, Dr E V Lynn, Chairman, was read by Dr B V Christensen This Committee is to be increased and the work continued

The report of the representative on American Council of Pharmaceutical Education was presented by Dr A G DuMez He stated that the Council had not yet begun to function except to act upon some special matter because there has been a lack of funds Plans call for $200 from each Association to start work on methods for standardizing of schools

The Council has under advisement a matter of undertaking a study of practical experience, a question referred to it by the American Association of Colleges of Pharmacy Another question which has been referred to the Council was "What Advance Credit Shall Be Given for Work Done by Pharmaceutical and Non-Pharmaceutical Member Colleges?"

Dr H W Youngken reported on Biological Abstracts, Dr Glenn L Jenkins for the National Conference on Pharmaceutical Research, Dean J G Beard for the National Drug Trade Conference Dr Paul Olsen reported for the Druggists Research Bureau and Prof R E Terry for the National Association of Retail Druggists Dean Edward Kremers reported on the progress of his work as Historian The reports were accepted

REPORT OF THE COMMITTEE ON RESOLUTIONS

The Committee on Resolutions, consisting of Dr W J Husa, Chairman, Prof R E Terry, Profs C H Stocking, Dr B V Christensen and Dean A O Mickelsen submitted the following report

A Resolution of Appreciation of President L D Havenhill's services was adopted

"The President's address contained a recommendation that the Association view with disfavor the merging of schools of pharmacy with other schools or departments, that the Chairman of the Executive Committee register vigorous protest to any and all instances of this character We are in accord with the view that every effort should be made to prevent the loss of autonomy

and professional organization, but we foresee that cases may arise in which the merger of two or more colleges of pharmacy might be beneficial in states having too many colleges of pharmacy Accordingly we offer a restatement of the resolution as follows

WHEREAS, the merger of colleges or schools of pharmacy with other schools or colleges may result in serious loss of autonomy and professional organization,

Resolved, that the Executive Committee consider such mergers individually and take whatever steps seem to be advisable to maintain pharmaceutical education at a proper level of professional independence "

The president recommended that the Committee on Curriculum and Teaching Method make a study of the Syllabus to determine possible improvements and adjustments "—Approved

In connection with the previous recommendation the president recommended that the Committee on Curriculum and Teaching Methods be increased from five to ten members We feel that this change would result in a more unwieldy and less effective committee "

With further reference to the President's Address we do not concur in the suggestion that it would be feasible to divide the four year course into a two year lower division of non technical instruction, with all professional work to be crowded into the last two years "

Dean Adolph Ziefle made four recommendations regarding the relation of the pharmaceutical curriculum to premedical training The Committee takes the position that pharmacy should be viewed as an end in itself, as a preparation for service through pharmacy, rather than as a preliminary training for another profession

We therefore disapprove the four recommendations concerning steps to be taken to obtain greater recognition of pharmacy as premedical training In reaching this decision we also had in mind the careful study made recently by the Committee to confer with the Executive Council of the Association of American Medical Colleges "

Dean Ziefle recommended that steps be taken 'To determine whether it is feasible to offer the degree of Bachelor of Arts in Pharmacy' '—Not approved

Dean Ziefle recommended that certain steps be taken 'To encourage the members of pharmacy faculties to give lectures and demonstrations in the general courses in hygiene and first aid and to offer courses of instruction in nurses training schools' We do not feel that it is necessary to reestablish a committee to study this question "

We approve of the three recommendations in Dean W F Rudd's paper

" *First* That we urge our member colleges to give the teaching of public health increasing emphasis and as far as possible use city and state public health officials in our faculties' " The latter statement was interpreted by the committee as meaning that occasional lectures be given by public health officials

Second That inasmuch as all drug commodities are primarily health concerns we go on record as urging that the manufacture jobbing and retailing of these commodities be under the direct control of properly qualified pharmacists, and further that our action be broadcast to constituent members of all organizations represented in the National Drug Trade Conference and that we ask their support as a public health measure

"'*Third* That inasmuch as the matter of standards of drugs cosmetics, etc is of primary concern in public health and since the colleges of pharmacy are in a neutral position between manufacturers of these products and government officials who are responsible for the enforcement of proper standards that we offer our services as a sort of liaison group between the interested parties, whenever it would seem to either side that the educators can serve the cause of public health' ' The report was accepted and the recommendations adopted

The following papers were presented

The Relation of a Pharmacy Curriculum to Premedical Education," by Dean Adolph Ziefle

' The Public Health in Pharmaceutical Education " by Dean W F Rudd

The resignations of the Medical College of the State of South Carolina School of Pharmacy, and of Meharry Medical College Department of Pharmacy, were accepted

The following officers were elected *President* Dean Ernest Little, Newark N J , *Vice President*, Dean Antone O Mickelsen, Portland, Ore , *Secretary Treasurer*, Zada M Cooper Iowa City, Iowa, *Chairman Executive Committee*, C B Jordan La Fayette, Ind , *Members of Executive Committee* to serve two years Dean L D Havenhill Lawrence, Kans , A G DuMez Baltimore, Md , *Member of the Syllabus Committee*, L W Rising

JOINT SESSION

The Joint Session of the American Association of Colleges of Pharmacy and the National Association Boards of Pharmacy is reported in the report of the latter in this issue of the JOURNAL This also contains the title of discussions and other reports made at the Joint Session

TEACHERS' CONFERENCES

PHARMACY, CHAIRMAN DR FREDERICK V LOFGREN

The following papers were read and discussed Theory of Pharmacy and Academic Standards," by W Paul Briggs The Grading of Preparations Made in the Pharmacy Laboratory," by Adley B Nichols 'The Method of Approach in Teaching the Pharmacy of New and Non Official Remedies,' by Marvin J Andrews 'Teaching Students How to Approach the Physician," by L Wait Rising Some Observations after Many Years of Teaching Pharmaceutical Mathematics," by Edward Spease

Two papers were read by title A Comparison of the Four Year Curricula in Pharmaceutical Subjects " by Dr Burlage and one dealing with dental preparations by Dr Richards At Dean Beard's suggestion it was voted that two papers on the Syllabus should be presented at the next year's meeting

Officers elected for the ensuing year were Dr W G Crockett, *Chairman*, L W Richards, *Vice Chairman*, and Dean Emery T Motley *Secretary*

CHEMISTRY, CHAIRMAN, DEAN HUGH E MULDOON

The following papers were presented and discussed Teaching Urinalysis to Pharmacy Students," by Antoine E Greene, 'Teaching Organic Pharmaceutical Chemistry by Glenn L Jenkins, ' How Should Fundamental Courses in Chemistry Be Taught in a College of Pharmacy," by Ernest Little Teaching Organic Chemistry to Pharmacy Students," by J R Harrod

Officers elected for the ensuing year were *Chairman* Prof Marion L Jacobs and Dr John C Bauer, *Secretary*

PHARMACOGNOSY AND PHARMACOLOGY, CHAIRMAN, C W BALLARD, TEMPORARY CHAIRMAN, PROF F H EBY

The following papers were read and discussed 'Why Study Botany?" by C C Glover, ' The Botany Course as a Foundation for Pharmacognosy, by O P M Canis, The Botany Course as a Foundation for the Pharmacognosy of Root Drugs," by B V Christensen, The Botany Course as a Foundation for the Pharmacognosy of Stem and Bark Drugs," by C C Albers, 'The Botany Course as a Foundation for the Pharmacognosy of Leaf Drugs " by H W Youngken, "The Botany Course as a Foundation for the Pharmacognosy of Fruit Drugs,' by J Hampton Hoch, 'The Botany Course as a Foundation for the Pharmacognosy of Seed Drugs,' by F J Bacon, ' The Botany Course as a Foundation for Pharmacognosy ' by George W Fiero The Value of Habitats in the Study of Pharmacognosy " by E H Wirth

It was voted that the conference should draft an outline on the subject of botany and suggest the minimum number of hours which should be given on that subject in the pharmaceutical curriculum The Conference adopted a resolution requesting the Executive Committee of the Association to recommend the appointment of a committee to study the conditions surrounding the study of botany

Officers elected for the ensuing year were *Chairman* Prof A John Schwarz, *Secretary* Dean Charles E F Mollett

ECONOMICS

Owing to the illness and death of Prof Amrhein, no program of papers had been prepared Dr Paul C Olsen, *Secretary* presided

Wroe Alderson addressed the conference about NRA and its effect on the retail drug business The address was followed by general discussion

Officers elected for the ensuing year were *Chairman*, Dr Paul C Olsen, *Secretary* Dean John F McCloskey

ABSTRACT OF PROCEEDINGS OF THE THIRTY-FIRST ANNUAL CONVENTION OF THE NATIONAL ASSOCIATION BOARDS OF PHARMACY HELD IN WASHINGTON, D C, MAY 7 AND 8, 1934

The thirty-first annual meeting of the National Association of Boards of Pharmacy was exceptionally well attended, 88 delegates being present from 34 states, and also ten honorary members, making the total attendance 98

President Gilbert's address is printed in May issue of the JOURNAL, A PH A

The report of the Executive Committee included a statement of income and expense from July 1, 1933 to April 30, 1934, showing a cash increase of $289 88 with total cash assets of $5865 55 A new budget for the fiscal year ending June 30, 1935 totaling $14 400 was outlined—a reduction of $335 over the previous year The secretary was also authorized to sign a lease for one year at $110 per month for the offices at 130 N Wells St, Chicago

The report contained one recommendation—that the offices of the Association be moved to the headquarters building of the American Institute of Pharmacy in Washington by May 1935, if possible

Secretary Christensen, in opening his report of the activities of the central office, stated that he had completed his twentieth year of service, and then made an interesting comparison of conditions twenty years ago with those of to day

A detailed financial statement was included, showing cash in the secretary's accounts as of June 30, 1934—$1604 07 The number of official applications issued during the ten-month period was 414—the total for the fiscal year was estimated at 500

Treasurer J W Gayle reported total funds on hand in his accounts of $4261 48, this report also being accepted and filed

An important question came up—that of providing work for college students, under the code, who need practical experience to meet the board entrance requirements The students cannot get jobs at code wages and no employer will take them at less or even without salary, as doing so is a violation of the code The suggestion was made that a joint committee of the three associations—National Association Boards of Pharmacy AMERICAN PHARMACEUTICAL ASSOCIATION and American Association Colleges of Pharmacy, be appointed to study the situation and bring it to the attention of the code authorities so that some special provision for this training can be made

The new *Committee on Minimum Standards of Technical Equipment*, A C Taylor (D C) Chairman, had done a great deal of work The report included a list of essential equipment for a pharmacy—the list having been compiled with the idea of making this the minimum

Chairman Roy B Cook's report for the *Committee on Re-Districting* resulted in the amendment of the By-Laws, which see

Director R L Swain made a brief report for the *Department of Education*, with the recommendation that it be continued, although inactive for the time being on account of financial conditions

RESOLUTIONS

Chairman A C Taylor presented the following resolutions

Resolved, That the National Association of Boards of Pharmacy hereby recognizes that the stability and security of pharmacy and the protection of public health depend largely upon an adequate and honest enforcement of the pharmacy laws of the respective states, and that the Boards of Pharmacy or other duly legalized enforcement agencies be upheld and encouraged in their law enforcement efforts

Resolved, That the National Association of Boards of Pharmacy recommend to the member boards that an average of 75% be required for passing the practical examination and that this grade be made compulsory beginning with the graduates who graduate in 1936 and that it shall not be retroactive in reciprocity

Resolved, That the National Association of Boards of Pharmacy give its whole-hearted and unreserved approval to all efforts to improve Federal and State Food and Drug Laws so that these laws will make for the necessary protection of the consuming public, providing, however, that such legislation does not confer unwarranted arbitrary discretionary powers upon enforcement agencies

Resolved, That every member board at present without a college graduation requirement (Arizona, Delaware, Massachusetts, Nevada, New Mexico, Tennessee and Vermont) immediately and seriously undertake to work for the enactment of such legislation, setting the year 1940 as a goal when every board shall be operating under a compulsory graduation requirement

Resolved, That the Legislative Committee be instructed to make a study of the problem of abolishing the assistant grade of certificate under the various state laws and present a definite outline or uniform plan for accomplishing this, without granting to the holders of outstanding assistant licenses any privileges other than those originally conferred by the law

AMENDMENT CONSTITUTION AND BY LAWS

The member States of this Association shall be grouped into the following eight districts (grouping may include prospective member Territory)

District No 1	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
District No 2	New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virginia and West Virginia
District No 3	North Carolina South Carolina, Georgia, Alabama, Mississippi, Tennessee, Florida, Puerto Rico
District No 4	Wisconsin Michigan, Illinois, Indiana, Ohio, Kentucky
District No 5	North Dakota, South Dakota, Nebraska Minnesota, Iowa
District No 6	Texas, New Mexico, Louisiana, Arkansas, Kansas, Oklahoma, Missouri
District No 7	Montana, Idaho, Wyoming, Utah, Colorado
District No 8	Washington, Oregon, Nevada, California, Arizona, Alaska

The question of adding a paper on Pharmaceutical Jurisprudence to the regular board examination had been referred to the Committee on Constitution and By-Laws for report After considerable discussion, a special committee was authorized to give the matter a full and complete study for report in 1935, inasmuch as a more adequate law enforcement program is needed

The election of officers resulted as follows

Honorary President F W Hancock, North Carolina, *President*, Charles H Evans, Georgia, *Secretary*, H C Christensen, Illinois, *Treasurer*, J W Gayle, Kentucky, *Executive Committee Member*, C Thurston Gilbert, Connecticut, *Syllabus Committee Member* Robert W Sterling, Illinois, *Resolutions Committee Member*, Frank Milne, Kansas, *Vice-Presidents*, George Moulton, New Hampshire, John M Woodside, Pennsylvania, E V Zoeller North Carolina, Albert Ely, Kentucky, William Muesing, Minnesota, C M Brewer, Oklahoma, R M Shultz Wyoming, R W Fleming, Nevada

JOINT SESSION

Dr Mordecai W Johnson, President of Howard University, was the first speaker and delivered an address on Professional Education of the Colored Man "

A most distinguished visitor, Senator Royal S Copeland, reviewed the Pure Food and Drug Bill, S 2800

Dr B F Christensen of the University of Florida opened the discussion on "Shall we have a general standardizing agency for recognition of colleges of pharmacy by boards of pharmacy or shall each state board act as its own standardizing agency?" Considerable spirited discussion ensued, until finally the report of the American Council on Pharmaceutical Education, which is the logical standardizing agency, was called for and presented by Dr A G DuMez, secretary

Dr C B Jordan read a paper, "Acceptance of Credit from Colleges of Arts and Sciences toward a Degree in Pharmacy—Is the Spirit of the Four-Year Course Being Fulfilled?"

The action taken by the N A B P in redistricting was outlined and the A A C P approved of the new districts and will carry out the same plan

The closing paper was read by Dr R P Fischelis—' The Trend of Student Enrollment in Colleges of Pharmacy as Revealed by a Study of Enrollment Figures for Past Ten Years " In the discussion of the report, the loss of foreign students was emphasized and a motion was adopted requesting the AMERICAN PHARMACEUTICAL ASSOCIATION to consider the advisability of calling to the attention of the people of Central and South America the advantages of pharmaceutical education in the United States

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council" —Part of Chapter VI Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

CHICAGO

The last monthly meeting of the Chicago Branch for the school year of 1933–1934 was held Tuesday evening May 15th, at the University of Illinois College of Medicine

The speaker of the evening was Dr William F Petersen, professor of Pathology and Bacteriology University of Illinois College of Medicine The subject was The Patient and the Weather" Dr Petersen gave a lengthy discussion, accompanied by lantern slides showing the relationship that has existed in many cases between the rise and fall of the health of patients and the barometer

It was pointed out that records prove that climates do have an effect upon the human being Next it was suggested that the condition of the air cannot be escaped by the human being, even if within the confines of a room Comparative graphs were shown which would lead one to believe that such a statement might be true It was also pointed out that maybe the weather has an effect upon our embryonic development that directs much of our physical and mental growth

Comparative graphs were flashed before us in such a rapid fire order it would be hopeless in this short space to give a detailed account of the discussion

LAWRENCE TEMPLETON, *Secretary*

NEW YORK

The May meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on May 14, 1934, at the College of Pharmacy Columbia University There were about forty five members and guests present

The meeting was called to order by President Charles W Ballard and the minutes of the previous meeting were read by the secretary and approved

Treasurer Currens reported the treasury with a balance on hand May 14th

Dr Bilhuber reported for the Audit Committee

Chairman Lehman, of the Committee on Education and Legislation spoke briefly on pharmaceutical legislation which was being supported by the State Association at Albany Unfortunately, changes had been made in Bill 417 regulating the sale of preparations containing poisonous or deleterious substances, which materially weakened the measure

Legislation was being encouraged which would make it a violation for a store without a pharmacy license to have on hand stocks of Tincture of Iodine for sale This was aimed especially at the so called Cosmetic Shops

President Ballard called upon Dr H H Schaefer to report on the A PH A Convention in Washington He stated that the attendance was as good as could be expected under the circumstances He called particular attention to the fact that the Remington Medal was presented to Sir Henry Wellcome at the banquet in the Shoreham Hotel on Tuesday night, May 8th

Dr Fischelis presided at the presentation On the forenoon of May 9th, the official dedication ceremonies were held for the new pharmacy headquarters building The exercises were held in front of the building and a very large group was present The services were very inspiring

President Ballard called attention to the fact that Dr Kassner[1] was seriously ill with pneumonia

The business part of the meeting having been completed, President Ballard introduced the speaker for the evening, Dr Johannes S Buck, who spoke on the Chemistry of Papaverine The speaker opened his address by discussing the occurrence of the alkaloid in the opium poppy Papaverine appears in the white poppy after 36 days and is present in opium to the amount of 0 5% to 1%, averaging generally about 0 5% There are about 20 other alkaloids present in opium The separation of the alkaloids is a long and tedious process of considerable expense, the method was outlined by the speaker He also pointed out that papaverine is usually separated out along with narcotine Papaverine was discovered by Merck in 1848 who reported its correct composition

Since Professor Diehl at Minnesota suggested the use of papaverine and codeine in the treatment of the common cold, very considerable interest has been aroused concerning the possibilities of a practical synthesis The success of the mixture in treating colds has made it necessary to investigate the possibility of synthesis since it is present in such small amounts in opium that the supply is negligible when compared with what the demand might easily become Since codeine is readily prepared from morphine a sufficient supply is available, however, since both ingredients are narcotics Dr Buck felt that the remedy would never become popular

The speaker discussed the early work done by Goldschmidt on the structure of papaverine This investigator worked for twenty years on the problem but did not solve it During this part of his address Dr Buck described the general process for determining the structure of an alkaloid by studying its degradation products formed by oxidation with potassium permanganate He described several processes for the synthesis of the alkaloid which have been employed experimentally The possibility of the commercial application of these was also considered Difficulties in manufacturing the necessary intermediates have thus far proved to be the greatest problem in a successful scheme Research on this part of the problem is being diligently pursued and it is hoped that a practical method giving good yields at reasonable costs will yet be developed

Considerable interest in the subject was shown by the audience in the numerous questions asked the speaker at the close of his address Dr Buck was voted a rising vote of thanks

RUDOLF O HAUCK *Secretary*

THE COOPERATION OF THE HOSPITAL PHARMACIST AND STAFF *

BY WILLIAM GRAY [1]

Pharmacy is an indispensable branch of medicine and the pharmacist who renders good service will receive the consideration and respect from his fellows that he deserves

The work of the hospital pharmacist differs materially from that of the pharmacist in the retail drug store, to the hospital pharmacist the most important part of his work is service while the pharmacist in a drug store is more interested in sales The hospital pharmacist must keep in close touch with the advances in professional pharmacy and be acquainted with the new remedies as they come into use, as well as with pharmaceutical progress in general He must always stand ready to coöperate efficiently with the medical staff and the administrative staff of the hospital

When new drugs appear on the market, the medical staff is usually in a position to know, or to desire to know whether the proposed remedy is of real value or meets a need in a new way, or whether it is just one more trade variation of a standard remedy or an old one dressed up in

[1] Deceased, see page 524, May issue of the JOURNAL

* Chicago Branch, A PH A

[1] Pharmacist to Presbyterian Hospital Chicago, Ill

new clothes The pharmacist should be in a position to furnish information on these points and should gladly assist in getting the necessary information to the staff In this way, needless loss of time to the staff and expense to the patients and the hospital can be avoided He must be able to suggest officially recognized and tested medicines as against more expensive proprietary or branded products This necessitates having at hand the most complete information available in such standards as the U S P , the N F and N N R He should suggest and be prepared to demonstrate to the individual members of the medical staff that although there are many valuable non competitive proprietary articles, many of these are the same in composition as official U S P and N F preparations We define as proprietary those articles with copyrighted names Attention should be called to the fact that there is a loss to the hospital when different brands of the same drug are prescribed, as this necessitates duplication of the drug stock and a heavier investment in the drug room and that unless the prescriber has a particular reason for doing so, no brand names should be specified

COÖPERATION WITH THE ADMINISTRATIVE STAFF

In the Presbyterian Hospital the pharmacy supplies about twenty units We have no dispensary or out-patient departments, these being taken care of by the Central Free Dispensary and Rush Medical College Our system is therefore designed to supply purely hospital needs

Each unit sends in a daily written order and the order is returned with the supplies to the unit With the exception of a few special prescriptions, there are no individual prescriptions put up in the pharmacy The individual doses prescribed by the physicians are taken care of by the nurses under the supervision of the head nurse on the floor

The dispensing of individual doses saves materials, it saves the time of the physicians and internes, it saves time in reaching the patient, and it makes for lessened demands on the time of the pharmacist, as such doses can be prepared in advance when he is not otherwise busy These stocks of standard drugs are kept, readily available, in the medicine cabinets on the hospital floors

Every conceivable dosage of medicine is prepared for use on the floors in such form that there is practically no danger of overdosage The nurse is not allowed to divide or multiply doses, that is to say, should the nurse have an order for 1/50 grain she must not use two 1/100 grain doses If 1/50 grain is not in stock the interne has to rewrite the order to read two 1/100 grains and by the same token she must not divide 1/50 grain to get 1/100 grain In the latter case the pharmacist must do the dividing This rule applies principally to ready made tablets No verbal orders for medicines are accepted by the nurses except in cases of emergency

All single doses of capsules pills and suppositories are safe that is, not above a maximum dose, and therefore taking the human equation into consideration should a wrong item be given it would not be a lethal dose

The only exception to this is in the operating room where mercuric chloride tablets are kept and used in making solutions for antiseptic purposes The mercuric chloride solutions used in the other units are prepared by the pharmacist, who with a few exceptions prepares all solutions used in the hospital We feel safe in saying that this system of handling drugs will safeguard all concerned

The need for keeping the expense of hospitalization as low as is compatible with efficient service is now widely recognized This need will be served if the prescriber can be induced to use official titles instead of trade marked names These names are listed in N N R a book that is in the hands of most prescribers

If we stocked all of the many brands of serums vaccines ergosterols cod liver oils malt extracts and compounds of the latter, we would tie up a lot of money that might be put to better advantage When a better product is sold under a trade name the specification of that particular brand may be warranted, but many of the trade marked brands comply only with the fixed minimum standards of the U S P

While the cost of ingredients is often passed on to the patient and therefore does not immediately concern the hospital both physicians and laymen are taking notice of the increasing cost of illness, and whatever is done to lessen the cost without lessening the efficacy of the treatment will be of direct benefit to the patient and indirectly will benefit the physician and the hospital

Another service that the hospital pharmacist may well be called on to give is the teaching of the rudiments of drugs, weights and measures to the nurses in training

At the Presbyterian Hospital we deal only with the practical side of such training We think a few lectures, in the time allotted would have little, if any, value, while a practical course has proved not only valuable to the nurse, but has the effect of safeguarding the patient as well as the hospital

The course is given to the student nurse only, and is of one month's duration The work is classified and checked All work is supervised, whether it be only filling small containers from larger ones, making dilute alcoholic and antiseptic solutions mouth washes, mixing, dividing and folding powders, filling capsules, making suppositories or preparing ointments

The first week is taken up with filling containers with simple items such as Boric Acid Magnesium Sulphate, etc , the second week in preparing medicinal solutions and in mixing powders This is where the nurses come into close contact with all sorts of weights and measures The last part of the training is taken up with preparing ointments, suppositories and miscellaneous items requiring more experience than is necessary in the early stage

Student nurses of the present day are exceptionally well qualified from the standpoint of previous education Many of them have taken or are taking college degrees All of them know the tables of weights and measures, and all have learned to translate percentages and decimals into common fractions and *vice versa* They have learned these things, however, in the way that most people have learned them—as abstract exercises, unconnected with actual practise The principal objective of their training in the drug room is to correlate this theoretical knowledge of weights and measures with the physical size of the various units

We do not give a final examination but give a review after the pupils have left the drug room The principal feature of the review is a quiz on pharmaceutical arithmetic, to satisfy us that the future nurse has developed a sense of proportion and has a thorough knowledge of weights and measures

As may be surmised, it is not possible to follow any set plan or course of instruction The demands on the Pharmacy from day to day or from hour to hour determine the work done by the pupils We believe, however, that the educational value of their work is all the greater since the purpose is not to pour into the minds of the pupils as large a mass of information as possible, but to vitalize what they do know

Finally, the successful hospital pharmacist is an enthusiast who loves his work and, no matter how exacting it may be, finds it interesting at all times

---

ARMY HOSPITALS TO BE STANDARD

Maj Gen Robert U Patterson, surgeon general of the Army, has taken steps further to improve and standardize the service of Army station and general hospitals, so they will be maintained on a standard well above the minimum required by the American College of Surgeons

WARNING ON POISON LABELS

The New York Pharmacist states "Section 122 of the Sanitary Code provides that all bottles or boxes containing poison shall bear a label upon which shall be conspicuously printed or stenciled in red ink in plain legible characters the name of the substance or article, the word 'POISON,' the name and place of business of the seller, or donor, a skull and crossbones, the word 'CAUTION' the maximum dose of the poison and the antidote therefor

The provisions of this section do not apply to medicinal compounds containing poisonous drugs in therapeutic doses when the maximum dose of such preparation is marked upon the container

'A Medicines of all types are not merchandise and therefore require the adoption of a policy, looking to the control of their sale

'B If a pharmacist wants to open a pharmacy, the State Board should have the right to approve or disapprove the project

"C The State Board should have the right to decide what products, preparations, etc , should be sold in registered pharmacies only

D By the same token, the State Board should have the right to license manufacturers

"E Any person or concern in the State, manufacturing any medicinal item, including cosmetics, should be required first to obtain a license to do so from the State Board "

THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

THE ABSTRACTS OF THE MINUTES OF THE SESSIONS HELD IN WASHINGTON, MAY 9 TO MAY 12, 1934

(See also brief summary in reports, Final Session House of Delegates, printed in the June JOURNAL and titles of papers will be given in the minutes, discussions, if any, will be printed when paper is published if not included in the minutes The Editor will be thankful for corrections of errors)

Abstracts of a large number of papers were distributed at the meetings, some have been printed Abstracts of some papers are still obtainable by addressing the JOURNAL A PH A , *2215 Constitution Ave , Washington, D C*

SCIENTIFIC SECTION

The First Session of the Scientific Section was called to order by Chairman F E Bibbins May 9th, at 2 15 The Chairman, in the absence of the Vice Chairman, requested Secretary L W Rowe to act as Chairman while he read his address The Chairman's Address follows

THE CHAIRMAN'S ADDRESS

BY F E BIBBINS

Members of the Scientific Section and Guests

By a custom followed for so many years that it has practically become a law, it is expected that the Chairman will open the session of the Scientific Section with the Chairman's Address "

It is a pleasure to welcome you who have found time to be present at our session, in spite of the many attractions and places of interest in this our Capital which are also calling you I wish also to extend our thanks to those who have contributed papers and thus made our program possible The meeting this year, coming so early with practically no advance notice, made it difficult for many of our members to finish their investigations and complete their papers in time for this early meeting

The Chairman's Address in times past has consisted of a brief review of the progress and developments in pharmaceutical research A glance at the list of papers on our program indicates that this review is unnecessary this year I think that we are to be congratulated upon the variety of papers, representing so many different pharmaceutical interests

At last year's session there was considerable discussion concerning the work and policy of the *Board of Review of Papers* This board has been in existence for several years, but for some reason or other they were seldom consulted or their advice sought regarding the publication of papers This year I appointed a committee of seven, with our Secretary as Chairman The personnel of this committee was selected so as to include men interested in Pharmacology, Chemistry, Pharmacy and Pharmacognosy With this representation we felt that we would have on the committee some one qualified to pass on papers relating to all the different subjects presented to our section It was necessary early in the year to pass a few papers for publication without referring them to the Board of Review of Papers in order to give Editor Eberle copy for the JOURNAL The balance of the papers was referred to the individual member of the committee best qualified for review before publication The committee report to be received later in these sessions will tell us more of their activity

The *Committee on Monographs* was continued with its original personnel so that there would be no interruption in their work of finishing the monograph on Aconite This was a formidable undertaking, much larger than the committee realized when they first took over the work This monograph is practically finished The question to consider now is How and where can it be published? Your Chairman has no recommendations to make but thinks we should all give this question some serious consideration

Committee on Ebert Prize —I wonder how many of you have given any thought to the operations of this committee and the difficulties under which they work We look forward each year to this report naming the author selected to receive this prize, little realizing the sacrifice that it

has meant on the part of some of the members of our committee to make this selection I was very much surprised about ten days ago to learn that this committee did not receive promptly all of the papers presented to the Scientific Section for consideration I found that the only papers which they can review between our annual meetings are those which Editor Eberle has been successful in publishing in the JOURNAL, then when the committee gathers for the annual meeting the real work begins The Editor turns over the manuscripts of the unpublished papers, some of which are very lengthy, and the committee with their limited time, has to consider both the published and unpublished papers This requires a lot of effort and hard work, and it also takes a lot of time I am sure that some of the committees on the Ebert Prize have worked far into the night on this job This is certainly unfair to the committee, to ask them to consider so many papers in so limited a time and may also be unfair to the authors because, without sufficient time for consideration a paper's value may not be recognized

To correct this condition, I believe the papers should be available to the committee soon after the annual meeting In order that this may be done I wish to recommend the following change in our By Laws Chapter IX, Article VIII reads as follows

'Disposal of Papers and Reports All papers and reports presented to the section become the property of the ASSOCIATION and shall be forwarded to the Editor of the JOURNAL immediately following the annual meeting by the Secretary of the Section "

I wish to recommend that it be changed to read as follows

"*Disposal of Papers and Reports* All papers which shall be in duplicate, and reports presented to the Section become the property of the ASSOCIATION, one copy of the papers and the reports shall be forwarded to the Editor of the JOURNAL immediately following the annual meeting of the Section, the other copy of the papers shall be submitted to the Committee on Ebert Prize by the Secretary of the Section "

At this time I wish to express my appreciation of the honor which you have conferred upon me by making me your Chairman during the past year I also want to acknowledge the splendid cooperation of the other officers and committees I wish to extend particular credit to our Secretary because it is largely through his planning and untiring effort that many of the papers on this year's program were obtained

I trust that we will have a pleasant and instructive session during our meeting here

On motion by James C Munch and seconded by E E Swanson, the Chairman's Address was referred to a committee Acting Chairman Rowe appointed as a Committee *Chairman* Glenn L Jenkins H W Youngken and James C Munch

Editor Eberle brought greetings and extended wishes for a successful meeting

The Secretary's Report was called for

Secretary Rowe reported verbally that the preliminary call for papers for the 1934 program of the Scientific Section was printed in the February number of the JOURNAL A PH A This was followed on March 21st by a notice to 270 members of the section The report was good considering the short time available, 75 titles and 70 abstracts were received for the program He stated that considerable correspondence was necessary and the assistance of the authors of papers as well as of the Chairman of the Section was very helpful and appreciated

The next order of business was Reports of Committees

Chairman E E Swanson of the Committee on Monographs requested that the report be deferred to the Joint Session It was so ordered

Chairman L W Rowe reported for the Board of Review of Papers He stated that seven members of the committee had cooperated in the examination of about 65 papers which were presented at the Madison meeting This has involved considerable correspondence and the fine spirit of cooperation evidenced by Editor Eberle and by other members of the committee is very gratefully appreciated by the Chairman The report was received

Chairman J C Krantz, Jr reporting for the Committee to cooperate with the National Conference on Pharmaceutical Research stated that there would be no report

Chairman Bibbins appointed the following on the Committee on Nominations *Chairman,* E E Swanson, F F Berg Fred V Lofgren

Chairman Bibbins said that before proceeding with the reading of papers it might be

well to state that if any changes in the By-Laws were made it would be necessary to bring in the report at the next session

The reading of papers was proceeded with as follows

"The Effect of Hydrogen Peroxide and Some Oxygenated Terpenes upon Ascaris Lumbricoides," by L W Butz and W A LaLande, Jr (No discussion)

"A New Method for Determining Acetyl Salicylic Acid in the Presence of Other Medicinal Products," by R M Hitchens The author supplemented the paper at considerable length

"Drugs and Bugs," by Ernst T Stuhr The paper was read by Adolph Ziefle, also 'Some Pharmacological Properties of Umbellulone" (No discussion)

Miss Nellie Wakeman was introduced by Dr Edward Kremers and presented a paper "A Chemical Examination of the Entire Plant of Celastrus Scandens" (No discussion)

Edward Kremers presented the following papers in abstract

'Analysis of Reduction Products of Catnip Lactone," and "Arsenoso Addition Products of Unsaturated Hydrocarbons" (No discussion)

Dr David I Macht presented the following papers 'A Pharmacological Note on Phyto lacca," and "Penetration of Volatile Oils and of Fixed Oils and Fats through the Intact Skin' The author introduced his subjects in the following

"I present two communications before this meeting with a purpose I understand that it will be the primary aim of the Institute of Pharmacy, which is to be established here in the near future, to investigate pharmacopœial and other officially recognized drugs I have recently been working on problems illustrating two different phases of such investigation One may be called a *de*structive problem because it reveals the uselessness of a preparation still officially recognized in the U S P and National Formulary The other research concerns a *con*structive problem and deals with the pharmacology of a large number of drugs officially recognized in the U S P but regarding the physiological action of which we know very little

'The first research deals with the pharmacology of *Phytolacca* This drug has been recommended by the old authorities for a large variety of conditions, yet there is practically no laboratory support for its therapeutic usefulness nor is there any strong clinical evidence in its favor I have been experimenting with a fluidextract of *Phytolacca* Its pharmacological action was studied by direct application to the mucous membranes, by injection—subcutaneously, intramuscularly and intravenously—into higher animals, and by various other methods, which will be described in a separate paper It was found that *Phytolacca* is very irritating to the mucous membranes This drug was also discovered to be very toxic on injection in mice, rats, guinea pigs and cats When administered to cats under ether anesthesia, *Phytolacca* was found to be very depressant for both circulation and respiration of these animals Additional studies made on kidney function and liver function revealed that neither of these was markedly affected by oral administration of the drug No other pharmacological finding, however, supported any of the therapeutic uses to which *Phytolacca* has been applied and the entire evidence indicated that this drug is absolutely worthless and might well be discarded from the National For mulary and Pharmacopœia of the United States

'The second investigation, of more constructive and profitable character, deals with the absorption of the fixed and volatile oils and fats through the intact skin I have undertaken this study because we have been interested in finding a vehicle which will promote the absorption of effective medicaments when applied to the skin The study was begun with a comparison of ointments prepared from vaseline, lanolin, lard, vanishing cream and falba base Ointments made with these vehicles contained a number of powerful pharmacological agents, but it was found that none of them promoted much absorption through the intact skin Contrary to the prevalent belief, there is little difference between lanolin and vaseline in effectiveness Of the fixed oils or fats which we studied lard seemed to promote absorption more than the other fats

"It then occurred to me that various volatile oils might perhaps be better carriers for medi caments than the ineffective fixed oils and fats This consideration was certainly supported by historical evidence because the ancients used volatile oils extensively in embalming and pre serving as well as in treatment of various skin affections I have therefore begun a study of a series of such officially recognized volatile oils as oil of cloves oil of wintergreen oil of lemon oil of orange, oil of sassafras oil of cinnamon etc It was found that these oils when applied

alone to the skin of such small animals as mice, were rapidly absorbed, produced toxic symptoms and usually led to death, if a sufficient amount was administered

"The next step was to incorporate a powerful pharmacological agent in some of these oils In this way it was found that absorption of certain drugs through the skin could be facilitated by dissolving them in the volatile oils The investigation is still in progress It is planned to study not only the volatile oils themselves but their various chemical constituents, and it is hoped that in this way some effective vehicle for carrying medicaments through the intact skin may be discovered "

Edward Kremers commented, in part, that in their physiological action, terpenes may act not as hydrocarbons as they are commonly regarded but as unstable peroxides into which they are readily converted in part by atmospheric oxygen

The next paper read was The Stabilization of Syrup of Ferrous Iodide, U S P X," by William J Husa and Lyell J Klotz It was discussed by Arthur Osol, H V Arny, H K Mulford and John C Krantz, Jr , and the author

Replying to Dr Osol, the author explained the method of determining the hydrolytic constants of ferrous iodide The effect of sunlight on color changes in the syrup was discussed by Dr Arny In reply to a question by Dr Krantz as to whether the preservative effect might be a function of the molar concentration of the dextrose or other sugar, Dr Husa pointed out that in the syrups containing hypophosphorous acid, free iodine could not appear, hence, dextrose was not to be considered as a preservative but merely as a substance giving the solution the properties of sweetness and viscosity characteristic of syrups H K Mulford asked whether the effect of ultraviolet light had been studied In response, Dr Husa stated that ultraviolet light does not hasten the decomposition of hydriodic acid, but that all parts of the visible spectrum do

The next paper, 'Drug Extraction I A Study of Various Menstrua from the Standpoint of Swelling Effects, Penetration and Extraction " by William J Husa and Louis Magid was presented by Dr Husa It was discussed by Messrs M W Quimby, J C Krantz, Jr , H V Arny and the author Mr Quimby asked whether the effect of the age of the vegetable tissues on the swelling properties had been considered, to which the author replied in the affirmative In regard to the results on extraction of drug powders of various degrees of fineness, Dr Krantz asked whether it was planned to work with powders of colloidal size Dr Husa replied that the work had been carried out on Nos 20, 40, 60 and 80 powders of the U S P and that when the fineness of powder reached a certain stage there was a decrease in efficiency of extraction due to adsorption of constituents by the greatly increased surface of the finer particles Dr H V Arny stated that the section had just listened to a historic paper Speaking as Chairman of the A PH A Committee on Research, Dr Arny pointed out that the research grants to Dr Husa marked a departure from former policies in that the awards were for specific research on drug extraction which would take more than one year for completion He pointed out the valuable services of W L Scoville in urging that a truly scientific study of drug extraction should be sponsored by the A PH A and in making plans for the scope of the work Dr Arny stated that the drug extraction research had been in progress for two years and that he hoped the grant would be made to Dr Husa for another year In conclusion Dr Arny said that he wished all of those present could have followed the progress of the work month by month as given in the detailed monthly reports submitted by Dr Husa to the sub-committee of five appointed to keep in touch with the work

The next paper, Investigation of Gleditschia Triacanthos," was read by Y T Oester

In presenting the next paper on 'Further Studies on Psyllium," the Chairman stated that other papers by the same author had appeared in the JOURNAL OF THE A PH A (No discussion)

The next paper entitled, ' Chemical Examination of Urographic Preparations," was read by George W Collins (No discussion)

The following papers were read A Continuous Reading Titration Apparatus," by L H Baldinger, and "Is Iris Versicolor N F V Adulterated?" by George M Hocking (No discussion)

The First Session of the Scientific Section was then adjourned

SECOND SESSION

The Second Session of the Scientific Section was convened by Chairman F E Bibbins May 10th, at 9 30 A M The reading of papers was continued

The first paper, Some Observations on the Stability of Quinine Sulphate during Storage," by L E Warren, was read

The three following papers were read by Horatio Wales The Water of Crystallization of Quinine Sulphate,' The Water of Crystallization of Codeine Phosphate," The Water of Crystallization of Emetine Hydrochloride " These were discussed by the author, John C Krantz, Jr and L E Warren

The following papers were read Some Considerations of Silver Picrate ' by John C Bird and Alfred Barol (No discussion)

An illustrated paper The Metabolism of Dulcitol and Dulcitan " by C Jelleff Carr and John C Krantz, Jr

The Effect of Isomannide on the Liver-Glycogen of the White Rat " by C Jelleff Carr and John C Krantz, Jr , was read by William Evans

C Jelleff Carr referred to work reported at the Madison meeting on the metabolism of mannitol and mannitan The studies have been continued using dulcitol and dulcitan The compounds are interesting from the standpoint of their metabolism and because of their relation ship to the widely used and important substances, glucose and mannitol In explaining the first slide the author stated that dulcitol is an interesting compound, apparently no one has investi gated it biologically, one of the reasons may be its cost It is used in bacteriological work The author explained the method employed in its preparation and the use they have made of it

William Evans said that no report on the metabolism of isomannide had been found in literature it was found that mannitol increased the blood sugar but did not affect the respiratory quotient Mannitan showed increase in the respiratory quotient but no rise in blood sugar Berthelet's method was used to separate the isomannide from mannitol

In feeding the rats a mixture of cacao butter and isomannide was used The liver glycogen obtained from these determinations indicates that the per cent was 41 compared with the normal In the experiments in which isomannide was administered by the stomach tube, rats were fasted for 48 hours and then given one Gm of isomannide and in these determinations the average per cent was 0 33 compared with 0 14 in the normal In feeding experiments the tissue liver glycogen was 700 per cent, compared with 1200 per cent in the normal, indicating a relationship The respira tory quotients obtained were slightly lower than those of fasting animals, administering 4 cc of a 50 per cent solution of isomannide there was a slight lowering of the respiratory quotient and somewhat less oxygen consumption Experiments showed that isomannide indicates that it is not a normal food in the body Toxicity experiments showed no toxic effects—the amount administered per 100 Gm of rat was 1 Gm , 1 5 Gm , 1 5 Gm and 5 doses of 2 Gm Further remarks are deferred to the publication of the papers

The next paper The Chemical Assay of Adonis, Convallaria and Apocynum," was presented by James C Munch

James C Munch presented 'Saliva Tests I Morphine " The paper was discussed by the author, Dr Penniman, and F A Upsher Smith (Discussion will accompany the paper)

The next paper presented was 'A Study of the Physical and Chemical Properties of a Number of Specimens of Calomel of American and European Manufacture " by Charles H LaWall and J W E Harrisson (No discussion)

An Experimental Study of the Assay of Citrine Ointment," by Thomas G Wright was next in order (No discussion)

The next paper The Active Constituents of Ergot A Pharmacological and Chemical Study," by Marvin R Thompson, was presented

In discussing the paper by M R Thompson on The Active Constituents of Ergot," John C Krantz, Jr , inquired whether the drug portion in the test-tube shown during the reading of the paper was devoid of all activity The author replied that it was devoid of all significant activity

E E Swanson inquired whether the liquid was an extraction of the new principle The author replied that it was, that every possible type of extract except that obtained by the use of petroleum ether changed the new alkaloid He stated that through the kindness of Dr A K

Hoff of Johns Hopkins University clinical confirmation was given of the pharmacological results that had been obtained His observations have been confirmed upon humans by the use of a technique similar to that employed by Moir in England

L W Rowe inquired relative to the stability of the new principle The author replied that he could say nothing very definite but observations indicate that the alkaloid is quite stable From observations upon crude extracts it seems that the prompt type of activity provides in these preparations for a much longer period than the whole individual delayed type of activity from ergotoxine and ergotamine

James C Munch inquired whether this new product affects the coxcomb method of assay The author replied that the currently accepted bioassay methods should be chosen purely with respect to accuracy and dependability, since the new alkaloid as well as ergotoxine or ergotamine is measured by the currently accepted methods including the colorimetric method of Smith None of these methods can distinguish the new from the old type of alkaloid It is for that reason that he was led to the conclusion some years ago that ergotoxine or ergotamine was completely representative of the drug itself The currently accepted methods can be made to serve as a means of insuring standardized amounts of oxytocic activity in crude ergot extracts

Dr M I Smith of the U S Public Health Service said that Dr Thompson in replying to Dr Munch stated that the new principle also gives the typical coxcomb reaction and epinephrine reversal reaction the same way as the old ergotoxine or ergotamine If that statement is correct it should be possible to have some means of evaluating the extracts It seems to him that there is now quite a little work which has been published indicating that ergot activity is measured by the well known pharmacological methods referring especially to the work of Clark some ten years ago He wondered if these apparent discrepancies could be reconciled

The author replied that one is not justified in assuming that aqueous extracts are all free from alkaloid If the figures are examined that have been published in the literature it will be found that especially with the coxcomb method the extracts are usually stated to be less than 25% of official potency requirements He had found that all reasonably good aqueous preparations of ergot similar to those used by Moir on humans had taken the amount of alkaloid which would provide 0 2 to 3 2 mg in doses of the size used by Moir The new alkaloid shows intense activity upon the human in a dose of one mg and therefore there is no real conflict of figures in an accurately determined alkaloid equivalent in these preparations

The next order of business was the report of the Committee on the Chairman's Address Secretary L W Rowe presided Glenn L Jenkins reported for the Committee, as follows

Our Committee highly commends the Chairman upon his excellent address We recommend that the work of the Committee on Monographs be continued We further recommend that the Scientific Section request a grant of a sum of money to cover in part or in whole the cost of printing the monograph on aconite from the Committee on Research of the AMERICAN PHARMACEUTICAL ASSOCIATION, if it is necessary

We approve the recommendation of the Chairman that Chapter 9, Article VIII of our By Laws be amended to read as follows All papers, which shall be in duplicate, and reports presented to the Section become the property of the ASSOCIATION, one copy of the papers and of the reports shall be forwarded to the Editor of the JOURNAL immediately following the annual meeting of the Section, the other copy of the papers shall be submitted to the Chairman of the Committee on Ebert Prize by the Secretary of the Section ' "

On motion the report was adopted

The reading of papers was continued as follows

The Bioassay of Squill Preparations ' by Harry Rosen

The Guinea Pig as an Hematopoietic Test Animal (A Preliminary Report)," by J W Landsberg and Marvin R Thompson (No discussion)

'Deterioration and Stabilization of Aconite Preparations ' by William B Baker

James C Munch was surprised to learn that aconite deteriorates so rapidly He had made considerable commercial experiments with it He wanted to know something about the storage conditions The author replied that on account of the shortness of time it was impossible to go into details, but the identification of aconite was made At the present time the results presented are mostly a confirmation of the work of E E Swanson The surroundings in which

the bottles were kept were the average room conditions as far as light and temperature conditions are concerned

E E Swanson stated that since the recent studies of aconite he had come to the conclusion that there should be a control for the standardization of aconite For example, the results in different laboratories and the animal variation is quite striking and he, therefore, thought that there should be a control of a standard

M R Thompson stated that the standard aconitine was used throughout this study as a control Standard aconitine prepared by recrystallization from alcohol and selected *in vacuo* had been used over a period of about three years

The following papers were read, on which there was no discussion The Rectal Absorption of Digitalis in Cats," by W Arthur Purdum, "The Bioassay of the Anterior Pituitary Like Sex Hormone," by L W Rowe A Simond and W O Nelson, and "Alkaloid Reagents VII Thallium," by James C Munch and Justus C Ward

The Second Session of the Scientific Section was then adjourned

THIRD SESSION

The Third Session of the Scientific Section of the AMERICAN PHARMACEUTICAL ASSOCIATION was convened on May 11th, at 2 15 P M by Chairman F E Bibbins

The following paper was read and discussed "The Comparative Antiseptic Action of Ointments and Related Products " by Arthur H Bryan

The following papers were read by title The Determination of Alcohol in Chloroform " by George D Beal and Chester R Szalkowski ' The Specific Gravity of Oil of Theobroma " by George D Beal and Chester R Szalkowski The Detection of Rosin in Balsams " by George D Beal and Chester R Szalkowski "The Gravimetric Determination of Camphor," by George D Beal and Chester R Szalkowski

The following papers were read (No discussion) A Note on the Arsenic Determination for Reduced Iron," by Margarethe Oakley and John C Krantz, Jr 'A Note on the Assay of Reduced Iron," by Margarethe Oakley and John C Krantz, Jr

Drug Extraction II The Effect of Fineness of Powder and of Variation in Solvents on the Percolation of Belladonna Root," by W J Husa and C L Huyck

Drug Extraction III The Function of Preliminary Maceration in Relation to the Percolation of Belladonna Root " by W J Husa and S B Yates

Drug Extraction IV The Effect of Variation in Solvents on the Extraction of Jalap," by W J Husa and Paul Fehder

(The foregoing papers were discussed, the discussions will accompany the publication of them)

The following papers were read and discussed (Discussions will accompany the papers) Pharmaceutical Applications of a Quantitative Barbiturate Test," by James M Dille 'Insulin Studies I The Effect of Insulin on the Blood Sugar of Mice," by James C Munch and Amelia M Ponce 'Pharmacognosy and Pharmacology of Ouari Nuts, ' by William J Stoneback, Harry J Pratt and James C Munch

The following papers were read by title Brom Alkyl Derivatives of Salicylic Acid ' by E Moness and W G Christiansen "An Attempt to Ketonize Ergosterol," by E Moness and W G Christiansen Sulfide Analogues of Azo Dyes Having Bactericidal Properties," W Braker and W G Christiansen ' Barbituric Acids and Structural Analogue," by W Braker T B Grave and W G Christiansen

The following papers were read and discussed The Potentiation of the Action of Strychnine by the Use of Various Drugs," by D A Spencer, J C Ward and F E Garlough ' The Pharmacology of Galinsoga—a Series of Micro Respirometer Studies," by Martin A Yavorsky and Edward C Reif U S P Standard for Digitalis," by F A Upsher Smith ' A Comparative Study of Absorbability of Seven Calcium Compounds " by A Richard Bliss, Jr and Robert W Morrison The Physiological Action of Synthetic *vs* Natural Camphor " by B V Christensen and H J Lynch 'Laboratory Notes on the Stabilization of Fluid Extract of Ergot by Elmer H Stuart and Francis E Bibbins 'Free Alkalinity in Glass," by L F Gabel

The following papers were read by title 'The Effect of Altitude on the Action of Strych

nine," by A W Moore and J C Ward "The Preparation of Chrysophanic Acid from Chrysarobin," by John H Gardner "A Note on the U S P Monograph on Chrysarobin," by John H Gardner 'Characteristic Tests and General Group Reactions for a Number of the Better Known Hypnotic Drugs," by Charles W Bauer

The Committee on Nominations reported, naming the following nominees *Chairman*, E V Lynn, *First Vice Chairman*, H M Burlage, *Second Vice-Chairman*, R E Schoetzow, *Secretary*, F E Bibbins, *Delegate to the House of Delegates* L W Rowe

James C Munch presided, Chairman E E Swanson presented the report On motion of John C Krantz, Jr , and a second, the chairman of the Committee on Nominations was directed to cast a unanimous ballot for the nominees

A vote of thanks was given the retiring secretary, L W Rowe, for his efficient services during the past six years

Under Unfinished Business the amendment embodied in the President's address, relating to Chapter IX, Article VIII of the Scientific Section, was re-read, on motion by F F Berg and a second the amendment was adopted

Frederick Greenbaum made a number of suggestions relative to arrangement of papers and the program He was of the opinion that 10 minutes should be allowed for presentation of papers, that only members should present papers and their connections should be given on the back of the papers presented He favored more discussion of papers, papers submitted by titles should be placed at the end of the program

Chairman Bibbins thanked Dr Greenbaum for his suggestions and stated that a number of them had been under consideration, the attendance varies from year to year and some are not familiar with the order of program

John C Krantz thought the suggestions made should be sent to the Committee on Review of Papers He also made a motion to the effect that the Committee on Review of Papers be given the power to suggest to the Editor of the JOURNAL the form according to which all scientific articles published in the JOURNAL should be in accordance and when this form has been selected that it be printed on the lower half of the inside of the second cover page of the JOURNAL He was of the opinion that there should be a uniform style in the JOURNAL

The Editor stated he would be glad to have the suggestions made and to coöperate with the Committee

Chairman Bibbins expressed appreciation of serving and thanked the members for co-operation

The officers were duly installed and they thanked the members for the honors conferred

(The Editor will confer with the Secretary relative to papers that may have been omitted, if any)

The meeting was, on motion duly made and seconded, adjourned

JOINT SESSION SCIENTIFIC SECTION AND SECTION ON PRACTICAL PHARMACY AND DISPENSING

The Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing was called to order by Chairman of the Scientific Section, May 10th at 8 30 P M Chairman Marvin J Andrews, of the Section on Practical Pharmacy and Dispensing, presided as Co Chairman

The first report called for was on The United States Pharmacopœia and presented by Chairman E Fullerton Cook (To be printed in these minutes or under Committee Reports) Motion was made that authority be granted to release the report and thereafter by a motion, duly seconded, it was received

The report of the Committee on National Formulary was called for (It is printed in the May JOURNAL, A PH A , page 513)

E Fullerton Cook said that the revision work on the National Formulary had gone aggressively forward It will be a book in which pharmacists may have pride The report was received

The report on the Pharmaceutical Recipe Book J Leon Lascoff, Chairman, was read and accepted (It is printed in the May JOURNAL pages 508–510)

The next item of the program was the report of the Committee on Glass Standardization The report was read by Ralph E Terry, it covers the third and fourth years of research on the deterioration of chemicals and pharmaceuticals when stored in colored glass containers (It is published in this issue of the JOURNAL under the title Deterioration of Certain Medica ments under the Influence of Light," by H V Arny, A Taub and R H Blythe) The report was accepted

The report of the Committee on Ebert Prize was read by Secretary Rowe and accepted It follows

REPORT OF THE COMMITTEE ON THE EBERT PRIZE

Mr Chairman and Members of the Scientific Section of the American Pharmaceutical Association

One member of the Committee on the Ebert Prize Award is not in attendance at the meeting of the ASSOCIATION and has not responded to the request of the Chairman for a written report on the evaluation of the papers read at the Scientific Section of the meeting at Madison The Chairman of the Scientific Section therefore, appointed another member of the ASSOCIATION to serve on the Committee of Award

All papers read at the Madison meeting of the Scientific Section both published and unpublished, have been considered It is the unanimous opinion of the Committee that no paper is of such outstanding merit as to be worthy of the award of the Ebert Prize Therefore the Committee recommends that the award be not made this year

(Signed) F F BERG
E E SWANSON,
L E WARREN *Chairman*

The report of the Committee on Monographs was read It follows

REPORT OF THE COMMITTEE ON MONOGRAPHS

After several years of careful work the monograph on aconite is nearing completion This monograph in book form will represent more than five hundred pages, counting of chapters on the botany, pharmacognosy, chemistry, pharmacology toxicology and clinical study of aconite The monograph consists of numerous illustrations of aconite plants roots and histological figures

Following the final corrections, vitamins and compiling of chapters the monograph on aconite will be turned over to the Chairman of the Scientific Section

The committee is now giving thought and careful consideration on the next subject for monograph study

(Signed) HEBER W YOUNGKEN,
JAMES C MUNCH
WILLIAM J HUSA
C J ZUFALL
E E SWANSON, *Chairman*

E Fullerton Cook moved the acceptance of the report with appreciation of the work duly seconded and carried

The following papers were read and discussed Determination of the Reasonable or Permissible Margin of Error in Dispensing III Suppositories " and the ' Determination of the Reasonable or Permissible Margin of Error in Dispensing IV Pills, ' by Marvin J An drews In reply to a question, the author stated that the question of deviation is a difficult one The work contemplated was the determination of weight and volume and this line has been followed The checking of amount of active ingredient contained in a prescription should be done by State Health Departments throughout the country and this will require work extending over a period of years

There being no further business, the Joint Session was adjourned

SECTION ON PRACTICAL PHARMACY AND DISPENSING

The First Session of the Section on Practical Pharmacy and Dispensing was called to order by Chairman Marvin J Andrews May 10th at 9 00 P M Vice Chairman Ralph W Clark pre sided during the reading of the Chairman s Address It follows

ADDRESS OF THE CHAIRMAN

BY MARVIN J ANDREWS

As Chairman of the Section on Practical Pharmacy and Dispensing it is my pleasant duty to welcome you to all the sessions to be held by this Section and we hope you will find these meetings inspiring so that you carry home with you some valuable information as well as a most gratifying list of new acquaintances

The opinion of the Chairman is that a new day has arrived for the Section on Practical Pharmacy and Dispensing with the completion of the new headquarters building of the AMERICAN PHARMACEUTICAL ASSOCIATION, The American Institute of Pharmacy," and I deem it a great privilege to have acted as your Chairman during the past year As history usually repeats itself, it may be well to review the outlook of Pharmacy at the time this section was formed some thirty-four years ago

The committee s first report was presented by its chairman, Dr Henry P Hynson, on the afternoon of September 5 1899 The Committee on Practical Pharmacy and Dispensing had been formed because of the waning interest of the practicing pharmacist in the affairs of the ASSOCIATION At its inception, the Committeee had as its purpose, to interest the retailer and to draw from him some of his rich store of information which daily experience and actual demand had given him To obtain the material necessary to form this section the work was divided between several persons and over 1000 members were interrogated by means of circular letters, personal contacts, etc It was noted, with interest, that the number of replies to the written communications was small, yet the Committee was not discouraged and the section was formed

We have often heard that pharmacy is not what it was in the good old days, and since this section was formed before your present Chairman was born, it seems fitting that he should quote parts of the first address and show that the section is in a much better position to day than it was in days gone by

Quoting from the address of the first Chairman we have the following interesting statements It has been said that pharmacy has degenerated and that much more was required of the dispenser in the 'good old days than at present We deny this and refer specifically to the scientific attainments, ready and comprehensive knowledge, and especially to technique Three prime facts are brought out—changes have occurred opportunities for galenical pharmacy still exist, and much dispensing knowledge is required We do not put up quite so many mixtures but we make many more solutions solutions of delicate and sensitive alkaloids which have to be accurately weighed, solutions which have to be made on a percentage basis unknown in the former periods We make less pills, but we fill more capsules, filled with masses and powders, soft elastic capsules filled with liquids, oils and alcoholics Ointments require more time, more good judgment than any other class of preparations You can hide your faults better *anywhere else* than you can in ointments! Tablets have come and in many instances are less trouble than pills or capsules Even a plaster must be spread occasionally, if not in a 1000 times then once in 5000 times That *proprietaries* have increased is, indeed a truth The 'good old days' show badly as compared with these hard times —the pricing of prescriptions is not a matter of individual caprice—we will invariably charge all that competition will allow—no more, no less Beyond and above all items the most encouraging fact established is that galenicals such as can be prepared by a competent pharmacist are still used '

The first committee suggested The Dispensary and Laboratory should be away from the public and apart from the sales department yet the two should be close together Apparatus and facilities should be plentiful Containers should be of sufficient variety and should be attractive " In conclusion Dr Hynson made the following statement "Not from without, but from within, does pharmacy need help—help that is practical "

It may have been unwise to take up so much of your time in briefly recalling the outstanding points of the first Chairman's report but it will at least remind us that the same problems that our predecessors had to face are with us today, and to point out more forcibly that we, as leaders in professional pharmacy should look forward with hope for the future of pharmacy, and allow the good old days" to remain as history

With the dedication of the American Institute of Pharmacy all who are in any way connected with our profession can look forward with pride to telling all classes of people, that the

home of American Pharmacy is located in one of the most beautiful spots in our National Capital After a long, hard struggle, the dream of having an ideal headquarters building is realized, yet we must all remember that *the future of our profession does not rest upon a beautiful building*, but that *it depends upon the cooperation of those interested in the advancement of pharmacy*

Since the formation of the American Association of Colleges of Pharmacy the standards of education in pharmacy have been steadily advanced The graduates in pharmacy to day receive an academic degree that is on a par with all other educational institutions With this active association we can rest assured that the educational requirements will be advanced to meet the professional demands of the future

The Section on Practical Pharmacy and Dispensing is primarily interested in the advancement of professional pharmacy which is accomplished through the following groups (1) recognized schools of pharmacy (2) hospital pharmacists, (3) retail pharmacists, and (4) manufacturing pharmacists It is my personal opinion that with the foregoing sources of obtaining information, this Section should be the outstanding section in the AMERICAN PHARMACEUTICAL ASSOCIATION or in any other association, for the advancement of professional pharmacy This will be the case provided those members who are interested in our work will give a few hours of their time in preparing papers or offering suggestions to the officers of the section The success will also depend upon the willingness of all future officers to do their share in making their meeting the outstanding meeting in our history

ACCOMPLISHMENT OF OFFICERS FOR THE PAST YEAR

Although this has been a short year to accomplish a great deal, it is with pleasure that your officers report progress since our last meeting Immediately after the sessions held in Madison, the officers began preparing a mailing list, which was to be used in an endeavor to stimulate interest in our section As a starting point, we selected the schools that hold membership in the American Association of Colleges of Pharmacy The first step in our program was to obtain catalogs from every school in this Association, and from these catalogs obtain the names of every person engaged in teaching either galenical, dispensing manufacturing or hospital pharmacy With this list, we then obtained from the issues of the JOURNAL of the AMERICAN PHARMACEUTICAL ASSOCIATION, the official programs presented before this section since 1920 With this information we then compiled our mailing list according to states This completed list gives the name and address of each school holding membership in the American Association of Colleges of Pharmacy, the pharmacy teaching staff of the respective schools, and the titles of the papers presented by each member of the pharmacy teaching staff before the Section on Practical Pharmacy and Dispensing according to the year presented, since 1920

This list reveals some very interesting facts, foremost of all, is that out of a total of 57 schools holding membership, only 29 have presented papers before our section since 1920 Out of a possible 211 teachers (professors, instructors and laboratory assistants) of galenical, dispensing, hospital or manufacturing pharmacy, only 49 have taken an active part during some of our meetings since 1920

We may well ask ourselves the following question Is this lack of interest due to the programs presented before our section or to the schools and their pharmacy teaching staffs? I prefer to think it is not caused by a lack of interest, but is probably due first to the known fact that a great many people are timid and are afraid to write papers, for fear they may be criticized, and second, to a want of encouragement on the part of the officers of our section The old worn out excuse that we do not have time to prepare a paper sometime during a period of five years is a direct admission that the members of that particular pharmacy teaching staff are overworked or are lazy It is always well to remember, ' Where there is a will there is always a way," and it is up to the officers of our Section to encourage that will

In addition to the above we have also prepared a list of hospital pharmacists, manufacturing pharmacists and retail pharmacists who should be interested in our section and we have invited each and every one to take an active part in the program this year A study of our program will show that we have been successful in interesting several newcomers in our section

The program for the 1934 meeting has been arranged so that Friday afternoon may be devoted entirely to Professional Pharmacy We have included on this part of our program, the papers dealing with hospital pharmacy, dental pharmacy and a majority of the papers dealing

with strictly professional pharmacy It is hoped that you will remain with us during both sessions

SUGGESTIONS FOR FUTURE OFFICERS OF THIS SECTION

In order for our section to progress in the future it will be necessary for the officers to adopt a definite program and see that the program is carried out until it is completed Very little will be accomplished if a great number of projects are started, without a long and tedious follow-up plan If you, as future officers become discouraged in performing your duties, don't give up, just remember that anything that is worth while is worth working for With this spirit continued for a period of five or ten years every one will look to our Section with pride

In order that our activities will advance in the future, we recommend that if you are selected as an officer for the Section on Practical Pharmacy and Dispensing do not accept the office unless you are willing to do your share in the work to be performed Your name appearing on the stationery will be an asset to the section if you work, or a liability, if you let every one else do the work and you try to take the credit Cooperation and team work are essential in any organization

Obtaining Papers—The officers for the past year have tried to encourage papers of *pharmaceutical interest* and have endeavored to refer the papers that should be presented before the Scientific Section to that section A mimeographed copy of Chapter IX of the By-Laws of our Section, accompanied each request for papers An invitation was extended to the younger members of the pharmaceutical profession as well as to our older friends It is hoped that the incoming officers will continue to follow this procedure

Types of Papers That Should Be Presented before the Section on Practical and Dispensing Pharmacy—Papers of real pharmaceutical and practical value can be prepared on the following subjects (1) *Professional Pharmacy*—(*a*) The successful operation of professional pharmacies, (*b*) publicity, which may include the professional relationship committees the U S P and N F publicity committees, or any individual or collective methods of placing retail pharmacy on a higher plane (2) *U S P and N F Preparations*—Suggested improvements for the now existing formulas and the devising of suitable formulas for the simples contained in the U S P or N F which may be adopted in the future (3) *Prescription Tolerances*—This topic is large enough for every one in the section to work on for three or four years, and still leave a great many phases to be worked out In pharmacy we need definite standards of this type which are now lacking (4) *Incompatibilities*—A detailed study should be made of the incompatibilities of the individual simples or preparations contained in the U S P and N F and in addition, the more important newer remedies (5) *Drug Extraction*—This alone is an endless field for research The above are only a few of the many problems that can be reported in papers before this section

Membership in the American Pharmaceutical Association—The officers as well as the members should endeavor to increase the membership in the ASSOCIATION Every person connected with the teaching staffs of our pharmacy schools specializing in any branch of pharmacy should be a member Membership among hospital pharmacists manufacturing pharmacists and retail pharmacists should be encouraged

Newly Elected Officers—It is suggested that the chairman divide the work to be accomplished for the year, and assign each officer a definite task to perform If the under officers perform their task well and prove that they are assets to the section, they should be advanced if not, they should be replaced

RECOMMENDATIONS

1 It is recommended that the nominating committee comply with the by-laws of our Section and nominate a second vice chairman This office has been vacant since 1928

2 It is recommended that a detailed report of the Committee on Prescription Tolerances be presented before the First Session of the Section on Practical Pharmacy and Dispensing each year until definite standards have been established It is further recommended that the President of the AMERICAN PHARMACEUTICAL ASSOCIATION in making the appointments to this committee, include, both the Chairman and Secretary of the Section on Practical Pharmacy and Dispensing either as associate or active members of this committee

3 It is recommended that the Section on Practical Pharmacy and Dispensing request the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION to appropriate an additional $[illegible]

for our Section This additional $50 to be used in collecting and correlating all propaganda that has been used in the various cities and states in this country for promoting professional pharmacy This propaganda will include the work of Interprofessional Committees U S P and N F Publicity Committees, Hospital Formularies, etc The purpose of this information is not for the AMERICAN PHARMACEUTICAL ASSOCIATION to carry on an expensive publicity campaign, but to assimilate data which will act as a guide for the various state and city associations that are interested in work of this nature

CONCLUSION

In conclusion I wish to express my sincere thanks to Secretary Ralph E Terry Vice Chairman Ralph W Clark Delegate L W Rising and to all other members of this Section who have cooperated with me in promoting the activities carried on by this group during the past year

Acting Chairman Clark commented favorably on the address and appointed as a Committee on Resolutions to whom the address was referred *Chairman* L Wait Rising, Leon Richards and H M Burlage

The following were appointed members of the Committee on Nominations *Chairman* W G Crockett J W Rose and J L Hayman

It was suggested by L M Kantner that the Chairman should hold office for another year The views were concurred in by J Leon Lascoff and others

REPORT OF THE SECRETARY

BY R E TERRY

Mr Chairman, Ladies and Gentlemen

Again it becomes necessary for the Secretary of this Section to render a report of his activities for the past year In the first place, unfortunately, it has not been a full year since the last meeting, this fact has been mitigated to some extent by the ready response the officers secured to their calls for papers The list as presented will tell more of the story of what has been accomplished than any sort of a detailed report

On the Secretary s part, the solicitation was carried out by means of personal letters This made it necessary to limit the number solicited, and while it is a rather large job the results warranted the effort A very high percentage of returns was secured in this manner

The Chairman carried a goodly part of the load, however, and it is through his endeavors, that the program is as well balanced as it is It was through his enthusiasm and labors that a number of new contributors was secured, and the Secretary wishes to pay tribute to the energy and activity of Professor Andrews

The only recommendation the Secretary wishes to make is to suggest to his successor that the practice of asking all who attend sessions of this Section to register in the book started at Madison last year be carried out This practice if continued, will give the Section a valuable historical volume of signatures It also offers a means of acquainting the officers with those attending and helps to knit the Section together

Again the Secretary wishes to acknowledge the help given him by the Chairman and to thank those present who have contributed papers at these sessions

The report of the Secretary was accepted

The report of the Committee on Prescription Tolerances was read by Chairman Hugo H Schaefer The Chairman stated that this report be made an annual feature (To be published with discussions under Committee Reports in a succeeding issue of the JOURNAL)

William F Reindollar stated that he was very much interested in the report and particularly the part on Capsule Tolerance He said the State Department in Maryland had made experiments to determine the weight of empty capsules and this confirmed the statement of Chairman Schaefer, which was to the effect there is so much variance in the weight of capsules due to air conditions that there is no uniformity

William J Husa said this report interested him very much and he referred to the fact that capsuls develop an odor

Chairman Andrews stated that a paper would be presented on Hand Filled Capsules" and further discussion would be deferred until after the presentation of that paper On motion

duly seconded the report of Chairman Schaefer was accepted (The report will be published in a succeeding issue of the JOURNAL and it is hoped to print with it abstract of the discussions which were part of the report of the Committee on Weights and Measures)

Referring to nominations, Chairman Andrews thought that both he and the Secretary felt they could do more constructive work as members than as officers He referred to a list of schools of pharmacy, members of which had been very much interested in this Section for a number of years This Section should be made the outstanding one of this ASSOCIATION

The following papers were read and accepted Accuracy and Speed Factors of Hand-Filled Capsules,' by John W Lee, Prescription Criticism," by J A Reese, Past, Present and Future in Pharmacy," by L M Kantner, Why Hand Molded Hypodermic Tablets Vary," by S W Bower

J Leon Lascoff inquired whether capsules filled by hand were more accurate than those filled by machine The author had made no comparisons William Gray said he had little trouble with variations in the weight of capsules

The other papers were not discussed

Secretary Terry stated that those who desired could have abstracts of papers (The JOURNAL has a few of the abstracts for those who desire copies, if they will address the JOURNAL office) Chairman Andrews referred to a display of foreign prescriptions by J Leon Lascoff (These prescriptions were donated to the American Institute of Pharmacy and with them a key translation)

Reading of papers was proceeded with as follows

"Studies on Bismuth Subsalicylate," by Wm F Reindollar

' The Problems of the Teachers and the State Board Examiners of Practical Pharmacy and Dispensing " by Harry W Mantz

' The Stabilization of Syrup of Hydriodic Acid, U S P X," by William J Husa and L J Klotz

'A Method for the Preparation of Parenteral Dextrose Solutions ' by H A K Whitney

Chairman Andrews announced that he would place this paper under ' Hospital Pharmacy ' He said there were four or five papers belonging under that sub head

Reading of papers was continued

'A Suggested Formula for White Liniment," by L H Baldinger

Shark Liver Oil," by W S Jones and W G Christiansen

' An Enteric Coating for Tablets," by Harold A Johnson and Ralph W Clark

Chairman Andrews announced that the next meeting would be a Joint Meeting with the Scientific Section and that the Second Session would be held on the next afternoon

It was announced that a paper by F W Nitardy not on the program, would be read on How Much Is a Teaspoonful?"

H Evert Kendig suggested that in view of the fact that the number of papers is increasing, instead of being read they should be presented in abstract so as to provide for more discussion The number of papers read in full permitted only very brief discussions and this is helpful

The First Session of the Section on Practical Pharmacy and Dispensing was adjourned (The Program of the Joint session with the Scientific Section is reported in connection with the minutes of the latter)

SECOND SESSION

The Second Session of the Section on Practical Pharmacy and Dispensing was convened at 2 00 P M, May 11th, by Chairman M J Andrews The reading of papers was proceeded with

The Place of a Field Representative in Cooperative Professional Advertising ' by L Wait Rising (No discussion)

The Committee on Chairman's Address presented the following report

It was not considered necessary to act on the recommendation of the Chairman relative to nominating a *Second Vice-Chairman* as that is provided for in the By-Laws

It was recommended that a detailed report of the Committee on Prescription Tolerances be presented before the First Session of the Section on Practical Pharmacy and Dispensing each year until definite standards have been established and it was recommended that the President of the AMERICAN PHARMACEUTICAL ASSOCIATION, in making appointments to this Committee to include

both the *Chairman* and the *Secretary* of the Section as associate or active members of this Committee The recommendation was presented in this way 'It is recommended that a detailed report of the Committee on Prescription Tolerances be presented before the First Session of the Section on Practical Pharmacy and Dispensing each year until definite standards have been established and they recommended further that the President of the AMERICAN PHARMACEUTICAL ASSOCIATION in making appointments to this Committee include both the *Chairman* and the *Secretary* of the Section on Practical Pharmacy as associate members of the Committee"

These recommendations were approved

The Committee recommended further that the Section on Practical Pharmacy and Dispensing request the Council of the A PH A to appropriate an additional $50 for the Section which is to be used in collecting and correlating all propaganda that has been used in various cities and states for promoting professional pharmacy This propaganda will include the work of interprofessional committees on U S P, N F Publicity Committees, Hospital Formulas, etc The purpose is to provide data as a guide for various state and city associations interested in this kind of work

The Committee presented the recommendation in this form, that $50 be appropriated by the Council of the A PH A for the purposes indicated

The recommendation was adopted

Chairman Rising said the Committee would like to suggest that inasmuch as the Section on Education and Legislation has considered a somewhat similar undertaking it would be invited to proceed in a cooperative plan

The recommendation was adopted

Chairman Andrews stated that it would be necessary to make a change in the program The first report was by R W Clark, "A Report on Interprofessional Relationship Work in Wisconsin" This article is printed in the *Wisconsin Druggist* for January and an editorial appears in the *Wisconsin Medical Journal*

The next paper presented was by F W Nitardy, 'How Much Is a Teaspoonful?"

The author had presented the paper, because the public is in the habit of using the teaspoon as a measure of dosage

On motion of I A Becker and a second by Aquilla Jackson, the paper was referred to the U S P and N F Revision Committees for consideration There was some further discussion and the motion made was adopted

Chairman Andrews requested that all members sign the official roster

Reading of papers was continued

"Problems in Dental Pharmacy," by A O Mickelsen

"Pharmaceutical Possibilities of Dental Supplies," by Leon Richards

Secretary Terry referred to a convention of dentists when there were about 4500 dentists in attendance

The paper as presented was published in the JOURNAL There was much interest in the subject at this meeting and to such an extent that he had received an invitation to attend the national meeting of the American Dental Association to be held in St Paul during the first week of August

Secretary Terry was appointed representative to the meeting in St Paul

The foregoing papers were discussed by Frank L Black, A O Mickelson and the authors The consensus of opinion was that this was a fertile field for pharmacists

Dr F B Kirby reported on two interesting state meetings which he had attended, one in Oklahoma and one in Kansas, where there was considerable interest manifested showing the growing contact with the dental profession He stated that at Marquette University, Milwaukee the dental students are taught to write dental prescriptions and he had been told that in Ann Arbor they also teach students to write prescriptions

The following papers were read

'The Successful Application of U S P and N F Publicity in a Retail Drug Store" by L S Williams

Chairman Andrews stated that this paper would be turned over to the Committee collecting information for U S P and N F publicity

"Professional and Commercial Pharmacy," by Aquilla Jackson

"U S P and N F Publicity in Maryland," by F L Black The author commented that in Maryland regional meetings were held and papers of this type were on the program Invariably these meetings prove helpful to those who attend

'A Professional Pharmacy," by Robert R Gaw

' The Extemporaneous Preparation of Intravenous Solutions Saline and Dextrose," by Robert S Fuqua

"Hospital Pharmacy," by Richard D Franklin

' Hospital Pharmacy Practice an Innovation," by J Solin Mordell

"Analysis of Magnesium Carbonate," by Harold A Bowers

"What Evils of the Present Day Are the Contributing Factors to the Destruction of the Professional Side of Pharmacy," by J B Tripeny

'A Professional and Scientific Basis for the Pricing of Prescriptions," by George L Secord

'The Phytochemical Study of Canchalgua Panamena," by R A Benedetti

A motion was made and duly seconded that the papers read be received —Adopted

The Committee on Nominations reported as follows For *Chairman*, H M Burlage of North Carolina, *Vice-Chairman*, L W Rising, Seattle, Wash , *Second Vice-President*, F L Black, Baltimore, Md , *Secretary*, L W Richards, Montana, *Delegate to the House of Delegates* R W Clark, Wisconsin

On motion duly made, seconded and voted the nominees were elected

Chairman Andrews thanked the members for their support and the honor of having been elected the presiding officer He hoped that the interest in professional pharmacy would grow and that the members would support the newly elected officers as he had been supported during the past year

L S Williams remarked that pharmacists in Baltimore are giving more attention to professional pharmacy and that physicians are contacted, all of which is helpful

W G Crockett said it was difficult to compare the results of work of one year with that of another but the program for this year is a most interesting one He thought that the method of working of one group of officers should be communicated to that of another year, so that advantage can be taken of the work done in the past

A rising vote of thanks was given the officers and the meeting was adjourned

SECTION ON EDUCATION AND LEGISLATION

The First Session of the Section on Education and Legislation was convened by Chairman George C Schicks, May 9th, at 2 30 P M

He regretted to advise that on account of serious illness in the family of Secretary Charles W Ballard, he would be unable to attend the meeting He, therefore, requested, W L Sampson to act as Secretary Chairman Schicks stated that there were few papers, so these could be freely discussed, he requested Vice-Chairman O E Russell to preside during the reading of his address It follows

ADDRESS OF THE CHAIRMAN

BY GEORGE C SCHICKS

A person on the outside, so to speak, may sometimes be in a better position to diagnose medical, dental and pharmaceutical ills than those whose daily contact with them has so altered their perspectives that the symptoms fail to have significance On the other hand it is sometimes difficult to prescribe even when symptoms point to a definite illness, for complications are not uncommon Each profession has its own ills, its own problems, but in the last analysis the problems of one profession are not so stangely unlike those of the other If one attends a meeting of physicians such topics as "Are you headed for the last round up?", "Dispensary abuses," and so on, are discussed, while dentists are discussing ways and means of overcoming cut-raters in their own ranks

Physicians have their problems with socialized medicine, hospital out-patient departments, dispensaries and organized medical centers, and the dentist finds that the same inroads are being made into his practice It has been determined that as high as 73 per cent of the

patients in some hospitals could afford to pay for the services of a private physician but instead accept free treatment

During the past few years the medical, dental and pharmaceutical professions have taken somewhat independent courses but kindred afflictions eventually foster closer harmony and there is at the present time a definite trend toward the renewal of associations with the consequent realization that mutual helpfulness is desirable

The basic training of the modern pharmacist is scientific The present day college course is so designed that the student not only learns pharmaceutical technique and the composition, preservation and compounding of medicinal products but it has been enlarged to include such subjects as bacteriology pathology biology, physiology and physics The inclusion of these and kindred subjects was not aimed merely to lengthen the college program but to make the man so trained more valuable scientifically

Having received his fundamental training and practical experience the graduate pharmacist if he desires to attain any degree of success must continue his study, not necessarily in a college, but he must keep informed concerning scientific research in the fields of medicine, dentistry and pharmacy He must place himself in a position to give the latest well-founded scientific information to members of allied professions He must be able to go even further, he must play the role of instructor to those seeking information regarding prescription writing, incompatibilities, official drugs and preparations, and new and non official remedies and accepted dental remedies

With such a scientific background upon which to build his business, the pharmacist must then look toward the creation of a demand for his scientific services But so much for the pharmacist

Pharmaceutical educators throughout the United States have during the past four years met with thousands of dentists before whom they have discussed U S P and N F preparations and at the same time urged them to use the scientific services of the pharmacist The eagerness to write prescriptions employing official drugs and preparations, as evidenced by members of the dental profession is almost astounding They have a most healthy desire to take guesswork out of the prescribing of dental medicaments

Here is the pharmacist's opportunity to enlarge the scope of his professional activity

Physician-Pharmacist meetings voice a similar interest in prescribing official drugs and preparations Physicians are frank in their criticisms of their own groups who depend too much upon pharmaceutical manufacturers for information regarding medicaments Here too is a definite trend toward the prescribing of official drugs and preparations—and here, too is the pharmacist's opportunity to enlarge the scope of his professional activity

Creating a demand for his scientific services requires that the pharmacist plan a definite, appealing and continuous campaign to urge the prescribing of U S P and N F drugs and preparations He must be alert to every opportunity so as to make the most of his professional contacts After planning his own campaign he should acquaint himself with the methods employed by other successful pharmacists—should become active in county state and national meetings held jointly with physicians and dentists

To the end that helpful information regarding ways and means of encouraging the prescribing of U S P and N F drugs and preparations be disseminated and made available to the pharmacists of this country, and to the end that the good work of one community or state be not lost to other communities or states, may I make the following recommendation for your consideration

That a committee be appointed—to be known as the National Committee on Professional Information Its specific function shall be

First—To study the methods used by the various local county and state organizations in their efforts to bring before medical men usable information on U S P and N F drugs and preparations

Second—To present to the pharmacists of the nation at our next annual convention or before if the committee deems it advisable a digest of constructive ideas gathered from such a survey

Third—The Committee is to act as a center for receiving and disseminating information which will receive the pharmacist s opportunities for professional scientific service

Fourth—The chairman of the committee and two other members are to be appointed by the incoming chairman of this section Others may be added, if the chairman desires, to make the committee workable

The report was on motion, duly seconded, accepted The Chairman stated that the Secretary's Address was embodied in his opening remarks Sympathy was expressed to Secretary Ballard The Chairman appointed as members of the Committee on Resolutions *Chairman*, W L Sampson H S Johnson and John A J Funk Members of the Committee on Nominations *Chairman*, H Evert Kendig, L W Rising and Ralph W Clark

Chairman Schicks advised that, unfortunately, it was impossible for Dr E J H Schneider who was to speak on Closer Relations between the Pharmacist and the Dentist, ' to be present The Chairman stated that Dr Schneider has many constructive ideas which can be advanced for the enhancement of the pharmaceutical profession

Dr Samuel M Gordon Secretary Council on Dental Therapeutics American Dental Association, found it impossible to be present on account of an earlier meeting but sent his paper on "Dentistry and Pharmacy ' which was read by the Secretary A O Mickelsen referred to this paper as a typical illustration of the cooperation of dentists and pharmacists Dentists, in the past, had not been trained to write prescriptions A great deal of good can be done in a professional way by coöperation, not so much in the group but with the dentists at home They should be invited to the college, the pharmacy, into the prescription department, using every opportunity to discuss individual problems with them They are eager to get information This affords one of the opportunities for pharmacy

Edward Ireland inquired whether dentists had been invited to talks or courses in pharmacy or prescription writing

Chairman Schicks replied that the invitation or, rather, the request came from them to our college, asking if we could be of assistance to them in giving information concerning drugs and their action, and in regard to prescription writing This last winter the college gave a series of six lectures to the Essex County Dental Society in New Jersey, free of charge to those dentists who would care to be present at those lectures This Society offers several branches of instruction to the members of their society each year, and of the six or seven courses offered we had a larger attendance in this particular course than any of the others The work was extremely successful " He said the lecture started about eight thirty, and at eleven thirty we were still there answering questions and conversing with the members of the dental profession We had six of those lectures and the work was entirely satisfactory to them and more than encouraging to our teaching staff

A F Marquier said he was glad to know that

Dean Evert Kendig concluded from his observation that the dentists have been brought in contact with the profession rather intimately during the last several years Although he is not connected with this particular work he reiterated what had been said, that dentists are anxious for information about drugs and it is only within the last five years and possibly a decade that they have become therapeutically conscious, due to the changes in the character of the dental profession This year they have introduced into the curriculum a year's study in what we would define as the practice of medicine At our own school in the Department of Dentistry, which is the old Philadelphia Dental College they have established a chair of oral surgery At the present time plans are under discussion for the erection of a building to house that particular phase of dental work This means stepping into the field of general surgery and those dentists will be trained to practice surgery of the mouth Unfortunately, the schools of dentistry have not been offered a proper course in therapeutics "

He referred to an experience recently in my own family The dentist supplied a few tablets for which he might have written a prescription He continued Last winter we celebrated the fifteth anniversary of the Philadelphia Temple University and in this connection the profession offered many lines The School of Pharmacy offered to dispense remedies suitable for the use of the different professions—The dental school the school of chiropody and so on—We had mimeographed copies of the formulas of U S P and N F products We mimeographed the same number of sheets to pass out, and we thought that the medical school would use a number largely in excess of the other schools Much to our surprise at the end of the first day the dental school had exhausted their supply of mimeographed sheets, and we had to run off some more In other

words, they are getting information they didn't know anything about It is a marvelous opportunity, if the pharmacists will only take advantage of it "

Marvin J Andrews said there is considerable discussion about pharmacists getting the dentists to prescribe He thought that it would be found that it is not only the dentists and the physicians who need to be informed in regard to U S P and N F products, but the pharmacists should be kept up to-date, to know what to give the physicians and dentists when they prescribe He did not think pharmacists should copy proprietary preparations, but inform the physicians how to prescribe and what vehicles are best suited

A B Nichols said "For several years I have been in close touch with medical association A man who is supposed to be trained in writing prescriptions still lacks the knowledge of how to write prescriptions These men come in and look at the exhibits and they become very enthusiastic Now when you have that situation in the medical profession, what must it be in the dental profession? There is no limit to what might be done In Philadelphia, we have had one or two small exhibits in a small way We have the coöperation of the Dental Association—a committee selected by the Association preparing standard preparations, things that they would like to see officially recognized as U S P and N F products The great difficulty is in getting pharmacists started on any one of these preparations Make them realize their opportunities by their own personal efforts and it will go over in leaps and bounds Of course it is a question of the individual You can't train all pharmacists "

A F Marquier wondered whether all this enthusiasm comes from the economic situation in which the country finds itself at the present time The dentists desire to learn something about drugs and medicine, how to write prescriptions and so on When it is all boiled down there must be a reason for it In every state where there is considerable emergency relief work there is a limited amount of funds These funds must be conserved, and it is the middle man who pays the bill The rich man and the poor man are well taken care of, but the middle man pays In a situation like this the medical society is very much interested in having the cooperation of the pharmacists, and he was of the opinion that it was the duty of pharmacists to give it

He said "In New Jersey, we have spent all winter going from one meeting to another, invited by the physicians, giving various talks on how to write prescriptions, and what are good things to prescribe " He considered this a wonderful opportunity, in his estimation, the biggest opportunity the pharmacist has had the last thirty or thirty five years

R A Lyman inquired whether the American Dental Society has a committee similar to the Council on Pharmacy and Chemistry of the A M A

Chairman Schicks replied that the Dental Association has a similar body and they have their own laboratory where they employ their own chemists, and have a council of dental therapeutics Analyses are made and are available to all pharmacists through the *Journal of the American Dental Association* They publish those separately and also give information concerning the analyses, and pharmacists can find enough information in any of these monthly publications to talk before any dental association they might have the privilege of addressing Chairman Schicks had been asked by a dentist where he could have dental prescriptions filled, he had tried unsuccessfully The dentist had gone 35 miles to have dental work done and he asked him why he did not go to a local dentist The dentist replied, ' No, I don't want to do that This fellow is a graduate of a very good school I feel he can do good work and I prefer going to him " Chairman Schicks said "All right—then, we have poor doctors and we have good doctors, we have good dentists and poor dentists, poor pharmacists and good pharmacists, and if you use discretion in choosing a dentist for yourself why don't you use the same discretion in choosing a pharmacist to fill your prescriptions for your patients?" He could see the logic in that In other words, there are plenty of good professional pharmacists, omitting those who are now taking care of the medical and dental demands, if they will take the trouble to search them out and use the same discretion as he used in obtaining treatment

Chairman Schicks welcomed several students of Rutgers University College of Pharmacy and invited them to participate in the sessions

Dr C L Whitman was introduced He spoke on "Dentistry and Pharmacy " He did not stick to the text but brought in experiences called to mind by the discussions He cited examples, among them the development of preparations containing sodium perborate He referred to the lectures mentioned by Dean Schicks

In summarizing, Dr Whitman said, in his opinion there were four ways in which the professions could coöperate *First*, individual contact between individual members of the profession *Second*, group contact by dental schools, pharmacy schools, societies of the two professions and student groups of the two professions *Third*, establishment of laboratories in pharmacies equipped for diagnosis And *fourth* constantly striving for the betterment of all the professions

R W Rodman was introduced by Chairman Schicks who referred to the publicity given by him at this convention Mr Rodman presented a paper on 'The Hospital Pharmacist and His Opportunity for Service to Pharmacy with the Medical and Dental Professions"

L W Rising considered this an opportunity for Schools of Pharmacy and Boards of Pharmacy to cooperate

O E Russell stated that in Indiana the hospital experience under a registered pharmacy is credited

O P M Canis did not think experience gained in drug stores filling only three prescriptions a day should be credited, but the law requires the recognition

A F Marquier referred to a practice of some hospitals to fill prescriptions for the public in their dispensaries, and this practice is carried beyond these limits

Secretary R B J Stanbury, of the Canadian Pharmaceutical Association, was introduced (Dr Stanbury has been a member of the A PH A for a number of years and a frequent attendant at the annual meetings) He said, in Canada the apprenticeship in hospitals is not of equal value to that in drug stores He also spoke of the increasing entrance requirements to schools of pharmacy in Canada He hoped for advancement in professional pharmacy

H W Mantz was of the opinion that good missionary work was possible in hospitals

A F Marquier discussed the difference of experience in hospitals and drug stores, experience is gained in the latter that does not obtain in hospitals

The discussion continued for some time on the experience question *pro* and *con*

W Bruce Philip introduced the subject of his paper on "Legislation in the Public Interest to Control the Sale of Drugs by Qualified Persons" by pointing out the purposes of legislation and the preparing of laws He discussed constitutionality, need of legislation, restriction by law, the public interest In closing his remarks the author said I welcome constructive criticism I do not care whether this bill or some other bill helps us to arrive at the desired point We must have something to shoot at and therefore center your shooting at this bill with the thought as President Roosevelt said—criticize if you will, but offer something to take its place"

Secretary Stanbury spoke of the codeine situation in Canada 'Some years ago we persuaded the department of National Health to remove codeine from the list of narcotics, particularly drugs, however, not from the poison list When a person buys codeine the druggist must register it as a poison That has removed a great deal of difficulty Codeine is used in cough mixtures and various preparations It removed a great deal of friction and difficulty with the physicians The physician can call up and order from his druggist a preparation containing codeine, he does not have to keep any record"

Harvey A K Whitney presented a paper on Some Notes on the Relationship of Physician to Pharmacist" A F Marquier read a paper on Timely Formulæ for Chiropodists" Dean Kendig considered this a timely paper which presented opportunities for the pharmacist

It was moved that all papers read before the Section be accepted—carried The First Session of the Section on Education and Legislation was then adjourned

SECOND SESSION

The Second Session of the Section on Education and Legislation was convened May 11th, at 2 15 P M, by Chairman George C Schicks

The first paper read was on Research in Pharmaceutical Education," by Wm J Husa (No discussion)

The report of the Committee on Resolutions was called for It was read by Chairman L W Rising The report was accepted

The resolutions are as follows

"To the end that helpful information regarding ways and means of encouraging the prescribing of U S P and N F drugs and preparations be disseminated and made available to the

pharmacists of the country, and to the end that the good work of one community or state may not be lost to other communities or states, *be it resolved*

' That a committee be appointed—to be known as the National Committee on Professional Information Its specific function shall be

First—To study the methods used by the various local, county and state organizations in their efforts to bring before dental men usable information on U S P and N F drugs and preparations

'Second—To present to the pharmacists of the nation at our next annual convention or before, if the committee deems it advisable, a digest of constructive ideas gathered from such a survey

'Third—The committee is to act as a center for receiving and disseminating information which will increase the pharmacist s opportunities for professional scientific service

Fourth—The chairman of the committee and two other members are to be appointed by the incoming chairman of this Section Others may be added if the chairman desires, to make the committee workable '

(The resolution did not reach the Committee on Resolutions in time to be acted upon, it will therefore, have to come before the next annual meeting—see minutes of the meeting of Executive Committee of the Council of July 17 1934)

Be it resolved that this Section on Education and Legislation appoint a committee to study the problem of cooperation with hospital pharmacists "

The Committee expressed appreciation of the splendid address of Chairman Schicks, the report was accepted

The Committee on Nominations presented the names of the following for officers of the ensuing year *Chairman*, Oscar E Russell, *Vice-Chairman*, C W Ballard, *Secretary*, L W Rising, *Delegate to the House of Delegates* George C Schicks

On motion of C L O'Connell and a second the report was received and the Chairman instructed to cast a unanimous ballot for the nominees

The next paper read was on ' Amendments to the Federal Food and Drugs Act Proposed by Drs H W Wiley and L F Kebler Nearly a Generation Ago," it was read by L F Kebler and accepted He stated that if anybody is interested in reading the hearing he may have the paper

Chairman Schicks thanked the acting secretary for his coöperation

The officers of the Section were duly installed

Chairman Russell took the chair and expressed his appreciation for the honor conferred and promised to continue the work along the standards set by his predecessor

Chairman Russell referred to the recommendations or resolutions wherein it was stated that the incoming chairman should name the two Committees the one on the National Dental Committee and the Committee on Cooperation with Hospital Pharmacists He named the chairmen of these committees and said he would appoint the members later On the Committee on Cooperation with Hospital Pharmacists he named as Chairman, R W Rodman, and on the National Dental Committee he named as Chairman, George W Schicks

The Second Session of the Section on Education and Legislation was then adjourned

SECTION ON COMMERCIAL INTERESTS

The First Session of the Section on Commercial Interests was convened by Chairman John A J Funk on May 9th, at 2 15 P M The Chairman welcomed those in attendance and stated that an interesting program would be presented

The first paper of the session was entitled ' Profit the Way Out ' by W Bruce Philip This was discussed at length by Henry F Heim, Edwin E Taiber Leo G Penn A V Burdine C Leonard O Connell and the author Discussion will accompany the paper in a later issue

The second paper was entitled ' Furthering Pharmaceutical Publicity through the Open or Partially Open Prescription Department " by W Bruce Philip

Lawrence Williams was pleased with the presentation he stated that he had in mind the installation of an open prescription department, but he could also see that it might not always work out very well He said the public is somewhat skeptical about the filling of prescriptions If the prescriptionist hesitates they begin to wonder whether there is anything wrong Also

there is sometimes the necessity of sending out for an item that is not in stock and required for the prescription, this is not easily done without observation in an open prescription department

Leo G Penn stated that he had found the open prescription department predominating in European pharmacies He was well pleased with his results

John F McCloskey was of the opinion that an open prescription department presented opportunities for good publicity He was in favor of a partially open prescription department

F P Kelly, Jr, stated that the open prescription department was working out very satisfactorily in his pharmacy It is necessary to maintain a well equipped clean department and do the work in a way that will impress the customers favorably

R R Gaw believed in an open prescription department He prefers a pharmacy wherein the public has full view of what is being done and the one who is doing the work

The next paper 'Detailing for Prescriptions" was presented by F B Kirby (No discussion)

The following papers were read

"Personnel Policies and Problems, by Dean Edward H Niles

Determining Cost," by Dean C L O'Connell

Secretary R W Rodman made a report (To be published)

Chairman Funk appointed the following as members of Committee on Nominations *Chairman*, C L O'Connell Francis A Britt and Fred Vilas

The Chairman stated that this concluded the program of the First Session and the Section was then adjourned

SECOND SESSION

The Second Session of the Section on Commercial Interests was convened by Chairman J A J Funk, May 10, at 9 10 A M

The following papers were read

"Price Stabilization and Selective Distribution," by Paul C Olsen

What Is an Adequate Order for the Prescription Department?" by Frank A Delgado

Drug Store Location " by Inez K Rolph

Vice Chairman Henry Brown stated that he had been informed by the Department of Commerce that there would be three papers The first paper Effect of NRA on Price Conditions," by Wroe Alderson and the next, "Discussion of Phases of the Drug Code " The discussion was in charge of R W Rodman

F A Delgado lead the discussion (To be published)

The Committee on Nominations reported the following list of officers *Chairman*, Henry Brown, Pennsylvania, *Vice Chairman* R W Rodman, New York, *Secretary* R T Lakey Michigan, *Delegate to the House of Delegates*, John A J Funk, Indiana On motion by John F McCloskey, duly seconded the report of the Committee on Nominations was accepted and the officers elected Chairman John A J Funk expressed his appreciation and thanked the members for the support given him The chairman elect expressed his appreciation and hoped for co operation in making the program for next year an interesting and profitable one R W Rodman the vice chairman, expressed regrets because of his absence during the sessions on account of publicity work He thanked Mr Brown for acting in his place which made it possible for him to look after publicity work for the ASSOCIATION

The Final Session of the Section on Commercial Interests was then adjourned (Parts of the minutes of the Section on Commercial Interests will be supplemented in connection with the publication of the papers and discussions of the Section, after submission to the authors and participants in the discussions)

The report of the Conference of Pharmaceutical Association Secretaries will be published in a succeeding issue of the JOURNAL, also that of the Conference on Law Enforcement Officials —*Editor*

SECTION ON HISTORICAL PHARMACY

The First Session of the Section on Historical Pharmacy was convened by Acting Chairman J T Lloyd at 9 40 A M May 11th The first paper presented was that by Charles H and Millicent R LaWall on A Pre Revolutionary Account Book of the Marshall Store in Philadelphia "

Mrs LaWall explained that the paper relates to a pre revolutionary account book of the Marshall Pharmacy in Philadelphia The book was exhibited, showing the handwriting which is legible There was no discussion, but the book was passed around among the members

The next paper on the program was by Dr Edward Kremers He stated that he was prepared in a way to give an illustrated talk but he regretted that he did not have the lantern slides with him The purpose of the slides was to show how these are used in teaching pharmacy, but not having these slides the lecture will have to be deferred to another meeting

Dr Kremers said that this month there will be a meeting in Basel, Switzerland, the first International Congress for the History of Pharmacy He had programs with him and in his opinion the Section on Historical Pharmacy, A PH A , should send a communication to the meeting in Basel and extend greetings by letter or cablegram in time so that these greetings may be received before the close of their sessions The suggestion was adopted

Chairman Louis Gershenfeld had arrived at this time and inquired how much work had been done

Edward Kremers explained the suggestion made by him and the adoption by the Section He also referred to the American History of Science Society which was now ten years old and stated that a local section had been formed in Washington He referred to the *International Journal* published by the Society and also to the eight-volume work on the History of Science in preparation by Dr George Sarton

Chairman Gershenfeld thanked Dr Kremers for his remarks He was of the opinion that something should be said regarding this Society in the JOURNAL OF THE A PH A and it was so ordered

Chairman Gershenfeld asked that the first order of business be taken up, namely, the reading of the Chairman's Address It follows

A PLEA FOR MORE OF THE HISTORY OF PHARMACY

LOUIS GERSHENFELD, CHAIRMAN

This week marks the formal opening of the American Institute of Pharmacy The importance of this structure to pharmacy has been emphasized by many speakers during the dedicatory exercises As important as the building is, both the museum and the library to be contained therein, much more important will be the spirit of the librarian and his staff and, especially the sincere endeavor they will display in giving these places a human aspect, a living thing, yes, in making them an integral part of living pharmacy

I am well aware of the fact that the Smithsonian Institution has a valuable museum devoted particularly to pharmacy The Library of the Surgeon General's Office has a valuable section of interest to pharmacy There are a few of the colleges of pharmacy and medical institutions which have valuable historical material suitable for a pharmaceutical museum or library but nowhere in this country do we have a distinct pharmaceutical historical institute We you and I this Section must guide the expansion of the historical facilities in the American Institute of Pharmacy so that the historical division will rank with the great historical institutes in other branches of science and especially with those interested in the history of medicine This must be done for the benefit of pharmacy so as to preserve and interpret the unity of scientific pharmaceutical effort The museum and library must be so established as to cooperate effectively with all schools of pharmacy and pharmaceutical organizations in furnishing displays and exhibits for informative and teaching purposes Facilities must be made available to develop more serious researches in historical pharmacy, with such an arrangement historical and bibliographical pharmaceutical research can be made to mean much for pharmacy Concerning the library and its place in historical pharmacy let us always remember Milton's words 'A good book is the precious life blood of a master spirit, embalmed and treasured up on purpose to a life beyond life" Ah yes it is this life beyond the life of its own day which must be revived and revitalized here as nowhere else so that you and I may comprehend and enjoy it

The time is also now at hand for this Section to take a more active interest in an attempt to have more of the historical element injected into pharmaceutical instruction The pharmacist is woefully ignorant of his profession Workers in pharmacy must be imbued with the fact that though they owe something to themselves as human beings, they owe something to the unity and

integrity of pharmaceutical science, yes, something to the traditions and heirlooms of pharmaceutical knowledge It is only by repeated inoculations that an historic appetite can be created and made permanent as part of the general make up, of any make up, of any individual It is by this means that it will be possible for the pharmacist to cultivate a liking for the history of his profession and to reveal for him the status of his particular branch of science in the circle of all other branches of science and particularly the natural sciences Historical pharmacy will teach him to look beyond a horizon limited by his own specialty into the great wide world of mental activity around and beyond him A pharmacist who knows only pharmacy knows but little of pharmacy The true spirit of pharmacy flourishes only through the fusion of the past and the present upon which it thrives Without historic perception the scientist lapses into the mechanic In the modern development of the pharmacist into a professional man or a scientist, let us not lose sight of the fact that we must start with the student in pharmacy and that somewhere in the educational system the former must be imbued with the fact that there is a tie up with the many branches of science in which instruction was given He must be made conscious of the noble history of pharmacy and the position that its study can occupy in aiding him through life The interweaving of the historic in pharmacy with the actual in instruction by radiating through all departments, can as a central force bring into closer relationship the many apparently separated departments so that all of them may bring about a more united front in attacking some of the greater problems in pharmacy which equally concern all of them The study of the history of pharmacy and pharmaceutical doctrines will broaden the viewpoint of workers in pharmacy and will liberalize their conception of their profession

In concluding these brief but I hope important remarks concerning historical pharmacy, may I voice a plea for a more active unit within our own Section? May I suggest that this Section go on record at this time in recommending to the parent body that those entrusted with the future plans of the Headquarters Building shall make arrangements in the latter for the development of a suitable historical division which by its gradual development may become a distinct pharmaceutical historical institute? May I also suggest that this Section recommend that the ASSOCIATION shall again voice a plea through its official publication for pharmacists to take a greater interest in historical pharmacy and for schools of pharmacy to have more of the history of pharmacy included in pharmaceutical instruction?

F H Freericks moved that the recommendations of Chairman's Address be referred to the House of Delegates It was so ordered

Chairman Gershenfeld stated that the interesting program was largely due to the efforts of Secretary C O Lee

The following papers were read by title

Medical and Pharmaceutical Contributions to Electrical Science," by Charles Whitebread

The History of the McNeil Laboratories," by Robert Lincoln McNeil

Historical Sketch of the Abbott Laboratories," by S DeWitt Clough

' History of Bauer and Black," by A E Tatham

The next paper read was on The History of Cactus in Medicine " by J T Lloyd The author stated that he hes tated a long time before he offered the title He obtained the history of the cactus from his father and made a trip to Mexico where he had obtained scenic views in connection with a study and collection of the cactus It was necessary for him to ask the Mexican government for permission to return and he was treated with greatest courtesy by the Mexican officials The author made further introductory remarks so that those present might understand the film

The cactus grows on the very crest of the steepest mountains, which presents the difficulties in gathering The native gatherers carry their loads down these steep mountains over precipices on their backs, to the uppermost point they can be reached by burros He thought this would make an interesting illustrated story but he was unable to get the desired picture and, instead, he presented moving pictures of his father prompted by the number of requests made by members of the ASSOCIATION

Heber W Youngken, Wm B Day and W E Warren expressed their appreciation of the illustrated talk presented by Dr Lloyd

A number of questions were asked relative to cactus and answered by the author

Edward J Ireland inquired whether it would be possible to have a record of Prof J U

Lloyd's voice in connection with a short talk when showing this film He thought that this would be of great interest to the Section on Historical Pharmacy

After considerable discussion it was requested that arrangements be made for recording the voice of Professor Lloyd This has been done and the record of the voice of Professor Lloyd, and also of former President James H Beal, has been placed on file and presented to the AMERICAN PHARMACEUTICAL ASSOCIATION

Chairman Gershenfeld suggested that it be the purpose of this Section, whenever possible to obtain records of voices of distinguished members

The next paper called for was that by John Kramer, presented by Prof Heber W Young ken, of Antoine Joseph Balard, pharmacist and chemist (No discussion)

The following papers were read, without discussion

'History of the Calcium Lactophosphate Preparations," by Wm J Husa and A P McLean

"Dante and the Florence Guild of Physicians Apothecaries and Merchants " by Edward Kremers

'American Pharmaceutical Journalism, Individual Journals," by Edward Kremers and Minnie Meyer

The First Session of the Section on Historical Pharmacy was adjourned

SECOND SESSION

The Second Session of the Section of Historical Pharmacy was convened by Chairman Louis Gershenfeld, May 11th, at 2 30 P M The first order of business was the reading of the Historian's report It follows

HISTORIAN S REPORT

BY E G EBERLE

The outstanding event of American Pharmacy is the completion of the Pharmacy building in Washington—the American Institute of Pharmacy— dedicated to those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy " The site is beautiful—the building faces the Lincoln Memorial, the historic river and Memorial Bridge may be seen from the building, also the Washington Monument and part of the dome of the Capitol

This Section passed the following resolutions

Resolved that the Local Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION, State Pharmaceutical Associations, Boards and Colleges of Pharmacy as well as other organizations and individuals interested in the progress and development of pharmacy be urged to supply documents of historical interest, relics and museum material to the museum and library of the Headquarters Building of the AMERICAN PHARMACEUTICAL ASSOCIATION at Washington and be it further

Resolved that organizations and individuals interested in the progress of pharmacy be urged to prepare papers on matters of historical interest for presentation to the Section of Histori cal Pharmacy of the AMERICAN PHARMACEUTICAL ASSOCIATION

The Leadbeater pharmacy, in Alexandria, was bought at public auction for the AMERICAN PHARMACEUTICAL ASSOCIATION, and as stated an association in Alexandria purchased the build ing and will maintain the historic pharmacy as a museum

Pharmacy's exhibit at the ' Century of Progress" interested the public and the visitors obtained a better understanding of the service of pharmacy, many pharmacists were registered and quite a number of them were from foreign countries The ' Century of Progress" will be opened this month and the Pharmacy Exhibit will be continued as an interesting part of it

The dedication of the Headquarters will bring ideas forward for sharing in the great work for American pharmacy It is hoped also to have complete sets of state and national proceedings, laws applying to pharmacy, histories of early pharmacy photographs of pharmacists who had a part in the development of pharmacy Individuals have copies of rare and old books which may serve a larger purpose if made part of the library or museum

At the Madison meeting Dr Edward Kremers delivered an ' Introductory Lecture to a Course in History of Pharmacy " He also presented an historical paper on "The First Modern

Pharmacopœia" Dr H H Rusby has published "Jungle Memories" in which he brings to light his experiences encountered in his expedition to Bolivia and Chile from 1885 to 1887

The Liebig museum at Giesen has a collection of glassware, typical of the Apothecary shop known to Liebig Arrangements have been made for the reproductions by the Gesellschaft Liebig museum at Giesen These bottles lend a charming and distinct note to a pharmacy and may be obtained from the society mentioned

DONATIONS

Mention has heretofore been made of donations to the AMERICAN PHARMACEUTICAL ASSOCIATION

Chairman H A B Dunning in his address at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, referring to the progress of the American Institute of Pharmacy, said

"Three State associations have contributed special funds for designated purposes The Texas Pharmaceutical Association for furnishing the offices of the Editor, the Maryland Pharmaceutical Association for furnishing the offices of the Secretary, and the Kansas Pharmaceutical Association has not as yet decided for what its fund is to be used Suitable acknowledgment will be made of these splendid contributions and it is hoped that the other state associations will make contributions for special purposes, thus emphasizing the close relations between them and the AMERICAN PHARMACEUTICAL ASSOCIATION and associating the name of each of them with the project

Reference was made in the April JOURNAL to donations by Dr F B Tipton and James E Hancock Among other acknowledgments during previous years are those by Mrs H M Whelpley of a large number of photographs, lantern slides, a complete set of U S Pharmacopœias, a large collection of badges and other historical contributions Mrs Albert Schneider donated a complete set of Dr Schneider's writings on various subjects Dr James H Beal has stated that additions would be made to the comprehensive library heretofore donated by him Lawrence Williams, of Baltimore, has contributed a collection of beautiful show globes, bottles and other apparatus and containers, Dr James A Spalding, grandson of Dr Lyman Spalding, the father of the U S Pharmacopœia, the proof sheets of Dr DeButts, of the first U S Pharmacopœia and letters dealing with the founding of this standard through E G Eberle and these are now part of the historical collection of the AMERICAN PHARMACEUTICAL ASSOCIATION

Moses Lichtenstein, of Cumberland, Md , has given the ASSOCIATION an Indian mortar and another large stone mortar, D F Jones, a cod liver oil syphon For the class of 1887 of the Eclectic Medical Institute, Prof J U Lloyd has presented a Wedgwood mortar together with its history The family of Frank H Carter has given a bell metal mortar from the pharmacy of George W Sloan and a Loving Cup presented by the ladies of the AMERICAN PHARMACEUTICAL ASSOCIATION to Frank H Carter who was Local Secretary of the 1906 meeting, held in Indianapolis

The School of Pharmacy of the University of Minnesota, through Dean Frederick J Wulling, will present a display case of illustrations of medicinal plants

There are many other contributions, all of which will be cataloged so that the donors may be properly and gratefully credited A number have promised contributions which are holding until they can be properly taken care of Cooperation has been promised by Dr Charles Whitebread of the Smithsonian Institution

A charter for a non stock corporation has been granted under the name of Landmarks Society of Alexandria It was also voted unanimously to restore the Leadbeater Pharmacy and building, as far as possible, to the condition of 1792, using the material recently discovered in the attic of the old Stabler store for this purpose From the opinions of the architects who have been consulted this restoration of the 1792 conditions appears to be possible This work could not be completed in time for exhibition in May The Leadbeater (Stabler) Apothecary was recently acquired for the AMERICAN PHARMACEUTICAL ASSOCIATION by the generous gifts of Manuel Hendler, of Baltimore G A Pfeiffer, of New York, and H A B Dunning of Baltimore

The fact that Mr George A Ball, of Muncie, Indiana has donated $1000 to the Alexandria Association shows a more than local interest A brief history of the pharmacy is in preparation and will appear in the JOURNAL prior to the next annual meeting of the ASSOCIATION

Both the Library and the Museum will serve an interesting and useful purpose, the former to serve pharmacists in research work and in a like way the Museum will have value in depicting the history and development of pharmacy and supplement other libraries and museums of Washington No specific plans are laid down but will be developed according to the contributions made and opportunities afforded

IN MEMORIAM

The following have served pharmacy and record is here made of work well done in the memory of the deceased we pause for a moment, among them are Joseph M Armitage, Prince ton, Miss , Florin J Amrhein, Boston, Mass , H E Benfield Cleveland Ohio, L C Brenner, Gonzales, Texas, Joseph W England, Philadelphia, Pa , E H Gane, Montclair, N J , H G Greenish, London, England Joseph L Mayer, Brooklyn, N Y , Barnett Miller New York N Y , L Mayer, Brooklyn N Y C C Plitt, Baltimore, Md , Robert Simpson, Philadelphia Pa , Walter V Smith, Philadelphia, Pa , Frank B Stephens, St Augustine Fla , Leo Suppan, St Louis, Mo , Walter B Swindell, Baltimore, Md , James A Yates Pittsburg, Kansas, Harvey B Robinson, Baltimore Md Brief sketches of the deceased may be found in the JOURNAL

The Historian expects to make further reports on the development of the library and museum as far as historical material is concerned The removal from Baltimore and the work in connection therewith has interfered with making a more complete and detailed report at this time It is a pleasure to note the instructive program prepared for this meeting

The report was accepted

Heber W Youngken inquired whether the Whelpley collection of slides were in such shape as to be used from time to time The Historian stated that these slides were on hand but had not been arranged for lecture purposes at this time, but he agreed with Dr Youngken that this should be done

An illustrated lecture was given by Charles H and Mrs M R LaWall on the 'Squibb Collection of Pharmaceutical Antiquities Being the Joe Mayer Collection of Wiesbaden "

The following papers were read by title

"A Brief History of Apothecaries Hall," by S G Gessner

"History of the First Twenty-Five Years of the Oregon State Pharmaceutical Association," by Dean Adolph Ziefle

"William Longshaw, Jr —Naval Surgeon and Pharmacist, a Hero of the Civil War," by Louis H Roddis, Lt Comdr (M C) U S Navy, Editor, Naval Medical Bulletin

The next paper presented was on ' Patent Medicines," by J Hampton Hoch

After conclusion of the paper, Edward J Ireland stated that very frequently historical papers do not have references which detracts from the value of the paper He suggested and made a motion that whenever it is possible references should accompany papers This was carried

The next paper presented was on "Notes on Early Drug Legislation," by F W Nitardy

The following papers were read by title

"History in the Drug Store," by F B Kilmer

'Alchemy," by W H Blome

"A Brief Account of the First Fifty Years of Pharmacy Education at Purdue, ' by C O Lee

The following paper was presented

"United States Patents Granted for Medicines during the Pioneer Years of the Patent Office," by Lyman F Kebler, former Chief, Drug Division, Bureau of Chemistry U S Department of Agriculture

The author stated that the paper was prompted as the result of some investigation which he was engaged in in connection with patent medicines

Hugo Kantrowitz as Chairman of the Committee on Nominations reported the following nominees for the ensuing year *Chairman*, C O Lee, Indiana, *Secretary* H W Youngken, Massachusetts, *Delegate to the House of Delegates*, Louis Gershenfeld Pennsylvania, *Historian* E G Eberle, Washington, D C

The report of the Committee on Nominations was accepted and the Chairman of the Committee on Nominations was requested to cast a unanimous ballot of the Section for the officers named The officers of the Section were duly installed

Chairman Gershenfeld called on Heber W Youngken, secretary-elect, for a few words He expressed his appreciation for the honor conferred and stated that he was very much interested in historical matters

A vote of thanks was extended to Chairman Gershenfeld —Carried

The Second Session of the Section on Historical Pharmacy was then adjourned

---

AMERICAN MEDICAL ASSOCIATION

The American Medical Association adopted the following resolution

Resolved, That the House of Delegates of the American Medical Association endorses in principle the report of the Medical Society of the District of Columbia on the subject of hospitals and dispensaries maintained by the United States Government in the District of Columbia, and the protest of the said society against the extension of the activities of these agencies beyond the legitimate purposes for which they were created, and be it

Resolved, That the House of Delegates recommend that the constituent state associations take such action as may so influence their representatives in Congress that the taxpayers of the country may be relieved of the unjustified expenditure of public funds herein set forth, and that the protest of the medical profession of the District of Columbia may be supported by the voting strength of the national profession

U S P AND N F EXHIBIT AT A M A CONVENTION

Western Reserve University's School of Pharmacy and the Academy of Pharmacy had three exhibits among the scientific displays of the American Medical Association's convention Two of these, the U S P and N F displays were particularly effective Each display was housed in its own booth and was in personal charge of the faculty of the School of Pharmacy

By means of show cards and samples mounted on the three walls of each booth the visiting physicians were told the why and wherefore of specifying U S P and N F preparations, among them 'The professional pharmacist is your source of information concerning the art of compounding Use him," "Your prescription is the final expression of your effort in the treatment of disease Without intelligent prescribing all else is almost useless," "These N F preparations are used in the hospitals of Cleveland," 'These official products may be obtained in any prescription pharmacy" The displays were supplemented by three neatly printed and bound brochures prepared especially for the occasion which were handed out freely to all interested physicians The titles of these were "A Message from the United States Pharmacopœia to Practicing Physicians," The United States Pharmacopœia and Your Prescription," 'The National Formulary Can Help the Physician"

Dean Edward Spease had charge of the arrangement and direction of the display

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

Reaffirmation of its position in favor of sound and constructive revision of the Federal Food and Drugs Act was voted by the American Pharmaceutical Manufacturers' Association in annual meeting, June 25th–29th The revision that the association favors and desires would outlaw false advertising of drugs and prohibit the sale of articles and devices which are dangerous to health when used as directed on their labels but it must preserve the principle of constructive variation privilege with respect to official drugs subject to label notice of such variation The association also insisted that such revision provide for an administrative board to review Resolutions were adopted relating to revision of the law

The election for officers resulted as follows *President,* Carl N Angst, Indianapolis, *Vice Presidents,* Jesse L Hopkins, New York, and R H Thompson Toronto, *Secretary,* C W Warner, Newark, *Treasurer,* Frank A Mallett, Des Moines, *Members of the Board of Directors,* George R Flint Decatur, Ill, H B Johnson, Pittsburgh, and Frank Schopflin, Kansas City

COMMITTEE REPORTS

REPORT OF THE COMMITTEE ON INTERNATIONAL PHARMACEUTICAL NOMENCLATURE

BY A G DUMEZ, CHAIRMAN

To the Members of the House of Delegates

Your Committee on International Pharmaceutical Nomenclature has been inactive for the past year This does not mean that the members have not been alert and willing to serve, but that the opportunity to participate in the development of a project in pharmaceutical nomenclature, international in scope, did not present itself Such work as is being done along these lines at present is apparently being confined to the countries in which it is inaugurated and no attempt is being made to develop it in an international way

Every now and then an international movement is begun to unify and improve the nomenclature in some fundamental branch of the sciences upon which the foundations of pharmacy rest but toward which we have little or nothing to contribute, except our moral support Such a movement was begun in the field of organic chemistry several years ago The objective of the movement was to formulate a set of definitions and rules to govern the nomenclature of organic chemistry so that greater uniformity would prevail A commission was appointed by the Council of the International Union of Chemistry to carry on this work This commission rendered its first report in September 1930 and a second report in 1932 A translation of these reports from the French was made by Austin M Patterson, and published in the *Journal of the American Chemical Society* last year

The rules for nomenclature laid down in the above report will be followed by the Committee on Nomenclature of the United States Pharmacopœia, and no doubt also by the committees of revision of other national pharmacopœias, so that indirectly the work of the commission on Revision of the Nomenclature of Organic Chemistry will play a part in the unification of pharmaceutical nomenclature

It would seem that, if this Association is sincerely interested in promoting greater uniformity in pharmaceutical nomenclature among the nations of the world it will have to take the initiative in inaugurating the movement designed to accomplish this purpose To be effective, however, any movement of this character will have to be financed and this is not a propitious time for financing new projects

REPORT OF COMMITTEE ON PHYSIOLOGICAL TESTING *

Your Committee has continued the bioassay of Tincture of Digitalis, made for this purpose in 1928, by the U S P X one hour frog method, as well as by other recognized methods The assay results indicate somewhat higher values this year than during the preceding year, and further studies are contemplated to determine whether these variations fall within the limits of experimental accuracy of the method Detailed results are given in the accompanying tables

During the coming year it is planned to continue these studies on the 1928 Tr Digitalis stored in 5 gallon unopened containers, assaying it by several methods against (1) ouabain, (2) a standard digitalis leaf, (3) a tincture prepared from (2) by the Chairman Close cooperation is being maintained with other organizations engaged in digitalis bioassays from other view points

Some progress has been made during the year in compilation of a Who's Who in Bioassays "

Clinical cooperation has been obtained and much time spent in completion of the AMERICAN PHARMACEUTICAL ASSOCIATION monograph upon "Aconitum " Clinical coöperation is now being sought for similar studies upon digitalis and its preparations

The Committee has been requested to consider the suitability of various standards of reference in routine bioassays, and an attempt is to be made to collect information to serve as the basis of recommendations to the U S P XI Revision Committee

* Washington meeting May 11 1934

TABLE I—COOPERATIVE ASSAYS OF A PH A TR DIGITALIS BY U S P ONE HOUR FROG METHOD CORRECTED FOR STANDARD OUABAIN VALUES

Lab No	Date Assay	Age Tr Mos	1 Ounce Tincture A Aa (Amber)	Ab (Blue)	Ac (Flint)	1 Ounce Tincture B Ba	Bb	Bc
1	July '29	5	6 5			8 0	8 2	
	June '31	28	6 5	8 0	7 0	6 5	9 0	7 0
	Mar '33	49	4 5	6 5	5 0	7 0	7 0	7 0
	Apr '34	62	4 5	6 5	5 0	7 0	7 0	7 0
2	July '29	5	7 9	7 9	7 2	7 2	6 4	6 4–7 2
	Feb '31	24	10 7–12 3	12 3	12 3–13 8	12 3	13 8	13 8–15 3
	Oct '31	32	13 3	11 7	15 0	16 7	13 3	20 0
	May '32	39	8 6	9 3	6 0	10 0	8 0	7 5
	Mar '33	49	7 5	8 3	8 3	8 3	7 5	8 3
	Feb '34	60	10 0	7 2	10 0	10 0	5 7	5 0
3	May '29	3	4 2	4 2	4 2	6 2	6 2	6 2
	Aug '29	6	4 0	4 0	4 0	4 8	4 8	4 8
	Nov '29	9	7 1	5 7	6 4	6 4	8 6	7 1
	Feb '30	12	6 0	5 0	6 7	7 0	8 6	8 3
	Jan '31	23	5 6	5 6	6 2	8 3	8 8	6 7
	Feb '31	24	6 2	5 9	6 2	7 3	7 7	7 9
	Apr '31	26	8 9	7 8	8 0		8 0	10 0
	Mar '32	37	6 0	6 5		4 5	6 5	
	June '32	40	11 0	11 0	10 0	11 0	15 0	15 0
	Mar '33	49	11 2	11 9	11 9	12 5	15 0	13 7
	Oct '33	56	11 1	10 0	11 1	12 0	12 0	12 0
	Jan '34	59	11 8	13 1	12 0			
	Feb '34	60	7 5	8 7	8 4	9 4	9 4	9 4
4	Feb '31	24	6 0–7 5	6 0–7 5	6 0–7 5	9 2–10 9	9 2–10 9	9 2–10 9
	Aug '31	30	8 6–10 0	8 6–10 0	8 6–10 0	12 0–15 0	12 0–15 0	12 0–15 0
	Mar '32	37	10 0–12 0	10 0–12 0	10 0–12 0	20 0–30 0	20 0–30 0	20 0–30 0
	July '32	41	6 7–8 6	6 7–8 6	6 7–8 6	10 0–12 0	10 0–12 0	10 0–12 0
5	Jan '31	23	4 7	4 7	4 7	5 6	4 4	5 6
	Apr '31	26	4 7	4 7	4 7			
	June '32	40	9 4	9 4	10 6	10 6	10 6	11 9
	Mar '33	49	8 2	7 7	7 7	10 9	8 6	11 4
	Mar '34	61	9 0	7 6	7 6	11 0	9 0	11 0

TABLE II—COÖPERATIVE ASSAYS OF A PH A TR DIGITALIS

Lab No	Method Assay	Date Assay	Age Tr Mos	4 Ounce Aa Cc /Kg	Ba Cc /Kg	5 Gallon Ac Cc /Kg
1	1 hr frog	Apr '34	62	5 5	6 0	6 0
2	1-hr frog	Feb '34	60	6 4	5 7	5 0
3	1-hr frog	Jan 34	59	8 9	11 4	
		Feb '34	60	7 5	8 1	8 0
	M L D guinea pig	Feb '34	60	2 5	3 0	3 5
	M L D cat	Feb '34	60		0 5–0 7	
6	Frog freq curve	Feb '34	60			13 4

TABLE III—COOPERATIVE ASSAYS OF A PH A TR DIGITALIS—1 Ounce

Lab No	Method Assay	Date Assay	Age Tr Mos	Tincture A Aa	Ab	Ac	Tincture B Ba	Bb	Bc
1	4 hr frog	July '29	5	9 0	8 3		12 0	11 0	
		June '31	28	7 5	10 0	9 0	7 5	12 0	9 0
		May '33	51	6 5	8 5	7 0	9 0	9 0	8 5–9 0

2	M L D frog	July '29	5	10 0	11 0	12 0	12 0	10 0	12 0
		July '30	17	15 0	12 0	14 0	18 0	16 0	16 0
		Jan '31	23	11 0	11 0	12 0	13 0	14 0	14 0
		Oct '31	32	15 0	18 0	15 0	18 0	18 0	18 0
6	Frog freq curve	Mar '32	37	12 2	12 2	11 9	15 4	15 0	15 4
		July '32	41	11 5	12 9	12 4	13 4	14 4	13 3
		Mar '33	49	12 2	12 0	12 0	15 0	14 4	14 2
		Feb '34	60	13 2	12 8	11 2	14 5	15 6	12 8
3	M L D guinea pig	May '29	3	5 0	5 0	5 0	9 0	9 0	9 0
		Aug '29	6	5 0			6 0		
		Feb '31	24	5 6	5 6	5 6	6 4	6 4	6 4
		Feb '34	60	2 3	3 0	2 8	3 5	4 0	3 0
5	M L D cat	Feb '31	24	0 68	0 87	0 86	1 17	1 18	1 29
7	Chem *	Feb '34	60	3 9	5 1	4 6	5 2	5 8	5 5
	*p*H	Feb '34	60	5 88	5 92	5 94	5 85	5 82	5 94

* Chemical assay by modified K-D method

*p*H by Wilson hydrogen electrode method checked against U S P Standard Tincture and recalculated to standard of 6 0 cc

TABLE IV —CHANGE IN A PH A TR DIGITALIS ON AGING ONE HOUR FROG ASSAY AVERAGE DATA FROM ALL LABORATORIES AS PER CENT U S P STANDARD

Age Mos	1 Ounce A % U S P	1 Ounce B % U S P	1 Ounce B as % of A	4 Ounce A % U S P	4 Ounce B % U S P	4 Ounce B as % of A	5 Gallon A % U S P
0			80			80	
3	143	97	68	143	97	68	
6	98	91	92				143
9	94	85	90				
12	102	75	74				
24	87	67	78				
30	61	48	79				
36	72	47	66				
42	65	51	79				
48	73	61	84				
60	67	65	98	85	77	91	95

(Signed) L W ROWE,
E E SWANSON,
JAMES C MUNCH *Chairman*

THRIFTY DRUG STORES (CALIFORNIA) ORDERED TO SURRENDER BLUE EAGLE

The Thrifty Drug Stores, a California chain with headquarters in Los Angeles, was ordered by NRA to surrender its Blue Eagles for violation of the trade practice provisions of the retail drug code

The case has been referred to the Litigation Division, with the request that suit be filed to obtain an injunction restraining further violation

According to press reports this order was made non effective by a court action Compliance with codes depends on confidence in the officials and in assurance that no partiality is shown in enforcing them

BUSINESS SUBSIDIES UNDER NRA

It is not right to say that business has received no Government subsidy Yet relatively a small percentage of those who went under the codes and volunteered to shorten hours and increase pay rolls were Government beneficiaries They put up the additional money needed out of their own reserves, and if reserves had already been exhausted they borrowed from private sources

EDITORIAL NOTES

Because of association matter in this issue a number of items were omitted from this department

COMPARISON OF CYANIDE ANTIDOTES

Sodium nitrite combined with sodium thiosulphate, sodium nitrite, methylene blue and sodium thiosulphate, in order of decreasing efficiency, have been found to be clinically useful and experimentally effective in protective and resuscitative treatments of fatal cyanide poisoning, according to a recent paper of P J Hanzlik and A P Richardson of Stanford University, School of Medicine They also found glycerinic aldehyde to be experimentally effective but clinically inadvisable

NATIONAL BOTANIC GARDEN IN WASHINGTON

The House Library Committee in coöperation with botanists and others has provided for the appointment of sub committees to carry on the work of establishing a great national botanic garden Frederic A Delano, chairman of the National Capital Park Planning Commission, has agreed to act as chairman of the general committee and will appoint the sub committees The project is of general interest including pharmacists More than 400 questionnaires have been addressed to botanic gardens in all parts of the world, seeking information, and many replies have been received

NORTHWEST RECTANGLE, WASHINGTON

'The Northwest Rectangle under plans announced by the National Capital Park and Planning Commission, promises to become an architectural rival of the downtown triangle, one of the world's most imposing cluster of Government buildings

'This site plan, released by the Park and Planning Commission shows graphically the composition of the proposed Northwest Rectangle On the extreme left (west) are the Naval Museum and Navy Building of the future Then come the National Institute of Health and Naval Hospital now in use Next are the projected War Department, three undesignated buildings and the Interior Building A strip along E Street between Eighteenth and Twenty-Third would be transformed into a chain of small parks To the south, between C Street and Constitution Avenue, are indicated the *American Institute of Pharmacy* National Academy of Sciences, Public Health Service and proposed administration building of the Pan-American Union The square bounded by Twentieth and Twenty-First Streets, C Street and Constitution Avenue and now occupied by a temporary building housing the Federal Trade Commission would be the site of some future semipublic building '

PERSONAL AND NEWS ITEMS

We are advised that the names of Mr and Mrs W Paul Briggs and of Mr and Mrs George M Hocking of Washington, D C, were not included in the List of Registrants in May JOURNAL, A PH A

At recent commencement exercises of St John's University, **Dean John L Dandreau**, of the College of Pharmacy, was awarded the degree of Doctoris Judicæ Scientiæ (S J D)

Samuel C Henry, former secretary of the N A R D, has been named associate editor of the *American Druggist*

Dean J G Beard was honored at the commencement exercises by associates at the University of North Carolina, on the completion of his 25th year as teacher in the School of Pharmacy

Thurston Merrell spoke on 'The Personal Factor in Pharmacy," at the recent meeting of West Virginia Pharmaceutical Association

A Kiefer Mayer was awarded the degree of bachelor of science in pharmacy at the commencement exercises of Indianapolis College of Pharmacy The degree was conferred by **F E Bibbins**, president of the Board of Trustees

E V Zoeller, of Tarboro, N C, was, on June 14th, presented with a national certificate of honorary membership in the Rho Chi Society The presentation was made at a dinner given at the State University by the local chapter after tributes had been paid to his life and career The other members of the Board of Pharmacy as well as the teaching staff of the School were present as invited guests Mr Zoeller became a member of the A PH A in 1878

John W Power was appointed to be an Administration member of the Code Authority for the package medicine industry Mr Power is now serving on other code authorities of New York

James M Penland, president of the Southwestern Drug Corporation, former president of the National Wholesale Druggists' Association and widely known financier and jobber, was married to Miss Ethel McLaughlin Dunn of New York City and Savannah, Georgia, June 13th, at Whitewright, Texas

Vice President John Nance Garner, a citizen of Uvalde, Tex, who got his political start from a drug store mishap, has been made a member of the Texas Pharmaceutical Association A sterling silver membership card was presented to him by representatives of that organization during the recent convention of the AMERICAN PHARMACEUTICAL ASSOCIATION in Washington

Clyde Eddy, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, well known pharmacist, writer and explorer whose thrilling 800 mile voyage down Colorado River has been given wide publicity, will again make that trip, associated with Dr Russel G Frazier of Bingham Canyon, Utah It will be known as the 'Eddy-Frazier Colorado Expedition"

The purposes of the expedition are to complete a pictorial record begun by Mr Eddy in 1927, to compile temperature records through Grand Canyon, and to accumulate geographical data concerning the river and canyons above Boulder Dam The Expedition will also place a bronze plaque at Separation Rapids where three members of Major Powell's party left his exploring party in 1869 and were killed on the rim of the canyon by Indians

The story of the first expedition by Mr Eddy was published in Down the World s Most Dangerous River ' English edition—' Danger River"

Purdue University has published in booklet form the address delivered by Edward Kremers at the Convocation celebrating the 50th anniversary of the Purdue University School of Pharmacy, entitled 'The Old Northwest Territory and Pharmaceutical Education"

The Oregon State Monthly has an article by Dean A Ziefle on "Pharmacy as a Vocation" Publicity plans have been started for the 1935 A PH A meeting to be held in Portland Ore in 1935

A study of the efforts of the drug industry to correct uneconomic price practices through carefully controlled distribution by E Allen Newcomb, son of E L Newcomb, secretary of the National Wholesale Druggists Association, was submitted to the faculty of Harvard University School of Business for his Master's degree

News-Week, of June 16th, states "Faculty members of the University of Chicago and newspaper men sat popeyed last week in the University's Oriental Institute Before them a panorama of the human race was unrolled on the screen It was a private view of 'The Human Adventure,' by Dr James Henry Breasted,[1] a film showing how the secrets of dead empires are brought to light by archeologists"

A reproduction of the establishment of Eli Lilly, Sr, which stood at Pearl and Meridian Streets, Indianapolis, fifty eight years ago is to be erected in a two story brick building The structure will contain as near as possible the same equipment that Eli Lilly, Sr had in the original laboratory in 1876 Some of this equipment has been preserved, and the instruments that have been lost or destroyed will be rebuilt The replica will be opened for the first time at the dedication of the research building in October

The Pharmaceutical Echo is published by the Student Branch, A PH A, State College of Washington The editor is Marlowe Dittebrandt, assistant editor, Alice Swanson The April number is dedicated to Miss Belle Wenz, member of the Faculty Board of Control Articles of that issue are of interest and well selected

OFFICERS OF STATE PHARMACEUTICAL ASSOCIATIONS

Reports on some of the State Associations were made in previous issues of the JOURNAL and additional items are added in this number

The JOURNAL will thank association officers for corrections of the list printed in each issue of the roster, in the advertising section The JOURNAL will also welcome reports and photographs of officers and donations of historical material for the museum of the American Institute of Pharmacy

A number of reports had to be omitted, and will follow in the next issue of the JOURNAL

[1] A pharmacist in earlier years

Idaho Pharmaceutical Association will sponsor a caravan of Idaho pharmacists to attend the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in Portland, Ore

ALABAMA

General Hugh S Johnson was called upon by the Alabama Pharmaceutical Association to include a markup covering labor cost as a part of the cost definition of the Retail Drug Code Another resolution called upon the United States military and naval commands to recognize the profession of pharmacy

Officers for the ensuing year are *President*, C C Thomas, Selma, *First Vice President*, N G Hubbard, Birmingham, *Second Vice President*, Sam Watkins Dora, *Treasurer* Wilbur Ward, Tuscaloosa *Secretary*, W L Bingham, Tuscaloosa W E Bingham[1] was presented with a loving cup as the oldest living member of the organization

ARKANSAS

The Arkansas Pharmaceutical Association met in Texarkana, June 12th 14th The members decided to make a special study of the model narcotic law and encourage policies in keeping with the ideas of the drug industry

The following officers were elected *President*, John F Cox, Hope, *First Vice-President*, Purcell Smith, Little Rock, *Second Vice-President*, T Howard Warfield, Stuttgart, *Treasurer*, Joseph Poch, Jr, Little Rock, *Secretary Manager* Ira Brite, Fort Smith Offices of the Association will be established in Little Rock

CALIFORNIA

The twenty eighth annual convention of the California Pharmaceutical Association held at Sacramento, June 3rd–6th, registered an attendance of about 400 It was one of the most definitely fruitful meetings ever held Discussions centered on codes and fair prices Mrs Edna Gleason gave fully of her time and energy in the past year and presided over the sessions with vigor and dispatch

The following officers were elected for the ensuing year *President*, C R Brogan, Los Angeles *First Vice President*, W E Rutherford, Santa Rosa, *Second Vice-President* Charles R Seward Pasadena, *Third Vice-President*, L J Fischl Berkeley, *Treasurer*, John Wagner, Long Beach, *Secretary*, Roy S Warnack Los Angeles *Executive Committee Chairman* Edna Gleason, Stockton, George H Frates, San Francisco, R M Leise, Los Angeles

COLORADO

Colorado Pharmaceutical Association had the largest meeting in its history Alfred W Pauley, of St Louis, was one of the speakers Among the resolutions was one urging the education of the public to the menace of price-cutting and misuse of the word drug "

The following officers were elected *President*, William C Alexander Salida, *First Vice President*, Paul G Stodghill, Denver, *Second Vice-President*, Clyde C Phillips Colorado Springs, *Treasurer*, V N Lagerquist, La Junta, *Secretary*, C J Clayton, Denver

FLORIDA

The following officers were elected by Florida Pharmaceutical Association *President*, Don Evans, Orlando, *First Vice-President*, Victor Wray Haines City, *Second Vice-President* George Taylor, Miami Beach, *Third Vice President*, J A Jones, Daytona Beach, *Secretary-Manager*, M S Adler Tampa *Members of the Executive Committee Chairman*, J K Clemmer, Miami, E P Purcell, Tampa, L H Penberthy, Tampa F Lindeman, Leesburg, and D G Perry, Avon Park

GEORGIA

Georgia Pharmaceutical Association elected the following officers *President*, W T Knight, Jr Savannah, *First Vice-President* R Lee Olive, Augusta, *Second Vice President*, Walter West, Sandersville *Third Vice President*, H Peters Manchester Robert C Wilson, of Athens was named *Secretary Treasurer* by the board of directors, in the post-convention session of the group

Discussion of price stabilization," the adoption of the mail ballot method of voting for elective officers in the future and the appearance of speakers of national renown attracted the largest assemblage of retail druggists ever recorded at a Georgia convention

IDAHO

The 28th annual meeting of Idaho Pharmaceutical Association was held at Lewiston, June 25th–26th No outside speakers were on the program and President J B Ostrander made no address The secretary's report was distributed in printed form the net assets of

[1] Deceased July 10, 1934

the Association were shown to be $1458 52

The following officers were chosen to serve for the year 1935 *President*, Charles Carter, Moscow, *First Vice President*, C R Isenburg, Rupert, *Second Vice President*, Earl Evans, Idaho Falls, *Secretary-Treasurer*, Elmer B Williams, Boise

ILLINOIS

Illinois Pharmaceutical Association elected the following officers *President*, George V Haering, Chicago, *First Vice President*, H M Anderson, Monmouth, *Second Vice-President*, L Brown Hamilton, Galesburg, *Third Vice President*, E J Merriman, Joliet, *Secretary*, W B Day, 715 S Wood St, Chicago, *Treasurer*, George Bennett, Urbana La Salle was chosen as the 1935 convention city

IOWA GROUP ASSOCIATION MEETING

An important meeting was recently held of Association officials including presidents and secretaries of various group organizations in Iowa Seventeen of the twenty one group presidents were present and fifteen secretaries All officers of the State association were present The purpose of the meeting was to coordinate the work of the various groups and come to a more definite understanding as to what may be accomplished

INDIANA

The following officers were elected by Indiana Pharmaceutical Association at its annual convention held at Lake Wawasee *President* E A Ridgely, Gary, *First Vice-President* Ed Harper Muncie, *Second Vice President* G D Revington, Monticello, *Third Vice President*, Ralph E Thornburg Syracuse and *Secretary*, F V McCullough New Albany

KENTUCKY

Kentucky Pharmaceutical Association elected the following officers *President* Henry Frankel, Louisville *First Vice President* W E Albritton, Paducah, *Second Vice President* E C Williams Adairville, *Third Vice President*, Herman Schuler, Covington, *Recording Secretary*, J W Gale Frankfort, *Corresponding Secretary*, R A Gale Frankfort *Treasurer*, William J Johnson Mayfield

LOUISIANA

Louisiana Pharmaceutical Association elected the following officers for the ensuing year *President*, William A Worner, *Vice Presidents*, Joseph Clesi, New Orleans A J Boudreaux, Opelousas, Henry Richardson New Orleans, Raymond Ware Monroe, and John P Campbell, Alexandria, *Treasurer* Elmo Cire, New Orleans, *Secretary* Paul Wellbacher, New Orleans, *Members of Executive Committee*, Roy A Dean, Monroe, and Eugene Vogt, Ferriday

MARYLAND

See June JOURNAL for officers of the Association

Among the speakers at the meeting were President Robert P Fischelis of the A PH A, A E Hungerford, Maryland Director of International Emergency Relief President Ernest Little of the A A C P, Dr Robert H Riley, Maryland Director of Health, and Dr Huntington Williams, Commissioner of Health of Baltimore President L V Johnson's address was forceful in many respects Evidently, he is not in full accord with all provisions of the New Deal

MASSACHUSETTS

Recommendations by Mr Adamo which were adopted by the convention include Reorganization of Massachusetts druggists by enrolling every registered pharmacist of desirable character, a paid executive for continuous administrative responsibility, revision of by laws, endorsement of the New England Drug Show, after a study by the executive committee when the time arrives, continuation of the usual scholarship in the Massachusetts College of Pharmacy

Officers for the ensuing year are *President*, Joseph A Martin Malden *Vice Presidents*, T Joseph McAuliffe Lynn, and John E F Cusick, Fall River, *Secretary* Carl G A Harring Newton Center *Treasurer* Lyman W Griffin, Allston, *Trustees of Permanent Funds*, John R Sawyer, Herbert Packard and P J Cuddyer

MISSISSIPPI

The Mississippi Pharmaceutical Association met in Jackson, June 18–20, 1934 An effort is being made in Mississippi to return the drug business to pharmacists

The following officers were elected *President*, Lew Wallace Laurel *First Vice President* J S Puller, Starkville, *Second Vice President* John C Hodge Natchez *Secretary*

Treasurer, S B Key, Jackson Tupelo was chosen as the convention city for 1935

NEW YORK

The New York Pharmaceutical Association met in convention at the Sagamore Hotel, Lake George, June 21st–24th The attendance was unusually large, meetings well attended, and one of the high lights of the occasion was a splendid address by Dr R L Swain During the convention more than one thousand names were added to the membership

The following officers were elected *Honorary Presidents*, John Scavoc, New York City, and Jacob Diner, New York City, *President* John F O'Brien Rochester, *First Vice President*, Henry Wildhack, Newark, N J , *Second Vice President*, Morris Brodkin, New York City, *Third Vice-President*, Charles Heimer sheimer, Brooklyn, *Executive Secretary*, Robert S Lehman, Brooklyn *Treasurer*, Richard Austin Cairo

It was recommended that the convention in 1935 be held at Hotel Sagamore

NORTH DAKOTA

The following officers were elected by North Dakota Pharmaceutical Association *President*, L G Beardsley New Rockford, *Vice-Presidents*, Cap H Saunders, of Minot, and A E Erickson, of Fargo *Secretary*, W H Sudro, Fargo, *Treasurer*, P H Costello, Cooperstown

The convention asked abolition of the classification of assistant pharmacists now established under state law, and suggested that special privileges to take examinations to become full-fledged pharmacists be accorded to men now holding positions under the assistant classification

PENNSYLVANIA

The 57th annual convention of the Pennsylvania Pharmaceutical Association met on June 19th, at South Mountain Manor, Werners ville, the largest number in the history of the Association, nearly six hundred being present

The officers for the ensuing year were elected as follows *President* Frank P Kelly, Car bondale, *First Vice President*, Harry E Wertz, Johnstown, *Second Vice President*, Henry V DeHaven West Chester, *Third Vice-President* J W Garlick, Upper Darby *Secretary Treasurer*, J B Pilchard, Harrisburg, *Executive Committee Chairman* Henry Brown, Scranton, John C Walton, Philadelphia Robert R Gaw Pittsburgh

The following were elected to honorary membership in the Pennsylvania Association Dr W O Frailey, Sr , Lancaster, Dr George A Gorgas, Harrisburg, Dr Richard V Mattison Ambler, Dr E F Kelly, Washington, D C

In 1935 the Association will cruise on Lake Erie, June 17th–21st

Much constructive work was accomplished and altogether the 1934 convention was conceded quite a success

(*To be continued*)

OBITUARY

OTTO P MEYER

Otto Paul Meyer, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, vice president of the Meyer Brothers' Drug Company, St Louis, died June 20th, in Port Huron Mich aged 64 years Pneumonia was the direct cause of his death

Mr Meyer was born in St Louis in 1870 son of the late C F G Meyer He received his education at Smith Academy and at the University of Michigan graduating in 1892 and became affiliated with the drug company on the completion of his studies Mrs Meyer, two daughters two brothers and one sister survive the deceased

W E BINGHAM

William Ellison Bingham one of the veteran pharmacists in the AMERICAN PHARMACEUTICAL ASSOCIATION and an *honorary president* of the National Association Boards of Pharmacy, died July 10th at his home in Tuscaloosa, following a heart attack, aged eighty years

Mr Bingham helped to organize the Alabama Pharmaceutical Association in 1878 He was chairman of the Committee which drafted the first Alabama pharmacy law, a member of the Alabama Board of Pharmacy and its secretary for many years At the recent meeting of Alabama Pharmaceutical Association he was presented with a loving cup in recogni-

tion of the esteem in which he was held, and as the oldest living member of the organization and its secretary for thirty four years

Mr Bingham is survived by a daughter and a son

E B SHUTTLEWORTH

Widely known and respected in both the Provincial and Dominion fields of pharmacy, Prof Edward Buckingham Shuttleworth died in Wellesley Hospital, June 24th, aged 92 years A veteran of the American Civil War and known as an artist, Professor Shuttleworth made pharmacy his life work teaching on the staffs of two colleges and acting for many years as Toronto bacteriologist His early education was obtained in Ireland, where he studied chemistry under Sir Robert Kane at the Royal College of Science, Dublin He came to Canada with his parents, he engaged in the drug business in Montreal and later conducted a wholesale drug establishment in Toronto

When the Ontario College of Pharmacy was founded, he was appointed its first dean and also established the *Canadian Pharmaceutical Journal*, in 1868, and edited the publication for many years In 1893, Professor Shuttleworth was made a Doctor of Pharmacy by Trinity University, and he was also an honorary member of a number of Canadian and American pharmaceutical organizations

LEGAL AND LEGISLATIVE

THE DRUG CODE BEST IN THE FIELD

The following is quoted from an editorial of the *Kanas Pharmaceutical News*

'With all its faults and weaknesses, its lack of vital parts which we believe are necessary for the complete success of NRA and the Retail Drug Code our (The Retail Drug) Code is the best yet of the many retail merchandising codes No other retail merchandising code has a 'cost provision' in it equal to ours The 'dozen price list' clause is in no other retail Code as yet We are far ahead of other retail groups Of course it is admitted that the 'cost' provision alone will not cure all of the many ills of price cutting but it puts a stop to selling below list price which is an important milestone along the highway to recovery and recovery is what we are striving to attain The next milestone to try for is an 'overhead' or 'operating cost to be added to price list' cost'

RETAIL DRUG CODE BOARD DISAGREES WITH DARROW FINDINGS

Small druggists have found in the retail drug code real protection against "the predatory practices of large operators according to a resolution of the Retail Drug Code Authority" The resolution, forwarded to NRA Administrator, Hugh S Johnson, 'condemns as intemperate 'unjust and unfair' the recent report of the 'Darrow Board" that the operations of NRA codes oppress the 'small man" and the resolution emphasizes that the retail drug code has neither created nor fostered monopoly

The administration, according to the resolution, has recognized the fundamental fact that the curbs on predatory competitive practices must differ between various fields of business activities, and the code authority expressed its confidence that all codes will be administered fairly by the administration 'to the benefit alike of the small man and the consumer"

PROHIBITED ADVERTISING IN THE CANADIAN FOOD AND DRUGS ACT

1 Subsection one of Section three of the Food and Drugs Act, Chapter seventy six of the revised Statutes of Canada, 1927, is amended by adding thereto the following paragraph immediately after paragraph (*h*) thereof

"(*i*) Adding to or removing from the list contained in Schedule A hereto such abnormal physical states, disorders, diseases or symptoms of diseases, and adding to or removing from Schedule B hereto such material, as may be deemed by the Minister to be necessary in the public interest"

2 The said Act is further amended by adding thereto the following section immediately after Section six thereof

'6*a* No persons or company shall import, offer for sale or sell any remedy represented by label or by advertisement to the general public as a treatment for any of the diseases, disorders or abnormal physical states named

or included in Schedule A to this Act or in any amendment to such schedule "

SCHEDULE A

Alcoholism, Appendicitis Arteriosclerosis Blood Poisoning, Bright's Disease, Cancer Diabetes, Diphtheria, Dropsy, Epilepsy, Erysipelas, Gall stones, Kidney Stones, Bladder Stones, Gangrene, Gastric and Duodenal Ulcers, Goitre, Heart Diseases, High Blood Pressure, Infantile Paralysis, Influenza, Lockjaw, Locomotor Ataxia, Obesity, Pleurisy Pneumonia, Ruptures, Scarlet Fever Sexual Impotence, Smallpox, Spinal Meningitis, Trachoma, Tuberculosis, Tumors, Typhoid Fever, Venereal Diseases

5 This Act shall come into force on the first day of January 1935—*Canadian Pharmaceutical Journal*

BOOK NOTICES AND REVIEWS

Handbuch der Experimentellen Pharmakologie HERAUSGEGEBEN VON A HEFFTER UND W HEUBNER, Dritter Band 2 Teil, with 66 figures, pages 621–1503 Julius Springer Berlin, 1934

This volume gives an extensive discussion of the pharmacological properties of iron, manganese, cobalt, nickel and their compounds The review of iron and its compounds is given by Professor Starkenstein (Prague) and covers more than 600 pages The book is written in an authoritative way, with a critical discussion of the very extensive literature and should be of great value to any pharmacologist The following two parts of Volume III, dealing with silver, mercury, copper, zinc lead, gold metals of the platinum group, aluminum, rare elements, bismuth, tungsten molybdenum uranium, chromium, cadmium, tin, vanadium will be published in the near future An excellent general chapter on the pharmacology of metals is contributed by Professor Heubner which should be of interest to any chemist and pharmacist Inorganic and organic compounds containing metals are discussed a critical review of oligodynamic action and of the effect of metals on growing organisms are found among other topics in this chapter Peculiarly enough, the beneficial effect of traces of certain elements upon the growth of plants and other organisms is not mentioned

The part dealing with the physico chemical properties of iron and its compounds is not entirely satisfactory The statement, for example that a strongly acid solution of ferrous iron is not oxidized by air (page 702) is wrong, actually such solutions are extremely sensitive to air oxidation

On page 730 it is mentioned that positively charged hydrous ferric oxide sols mainly adsorb negative substances Primarily however, we are dealing in these cases with a hydrogen ion adsorption with a subsequent secondary adsorption of negatively charged ions or complexes The outstanding role of the hydrogen ions should have been pointed out more clearly

The above mentioned statements do not detract from the merits of the book The printing and appearance are excellent In addition, the publisher deserves praise for his optimism in making available a handbook of this size in these times—I M KOLTHOFF

International Formulary of Ships' Medicines, 1934, issued by the International Pharmaceutical Federation, 43 Leeuwenkstraat, Leiden, Holland

In 1929 the Netherland Association for the Promotion of Pharmacy drew attention to the difficulty experienced by pharmacists in seaports in replenishing Ships' Medicine Chests There is not only a difficulty in ascertaining the formula required but delay may be occasioned and result in a ship leaving without being able to obtain the necessary medicines It is to overcome these difficulties that the International Pharmaceutical Federation prepared this volume issued under the direction of Dr J J Hofman, President, and Dr T Potjewijd, General Secretary The Board of the Federation expresses indebtedness to Secretary H N Linstead, of the British Pharmaceutical Society, Dr Fritz Wartenberg of Berlin and Prof E Collard of the Faculty of Pharmacy Strasbourg The Board states that it is hoped this book will be used extensively and that it will simplify the work of pharmacists in seaports and those responsible for the care of medicines on board of ships

The countries represented in this volume are Belgium, Denmark Finland France, Germany Great Britain Greece, Italy, Netherlands Norway, Portugal, Spain Sweden and the United States

It is not compulsory for American ships to carry any medicine, but a list of preparations has been recommended by the American Marine Standards Committee of the Department of Commerce These preparations include aromatic spirit of ammonia, aspirin tablets, sodium bicarbonate tablets, bismuth subnitrate tablets, mercuric ointment, sodium bromide tablets, brown mixture tablets, calomel ointment, castor oil potassium chlorate tablets, compound cathartic pills, Dover's powder, ear drops, eye solution, gargle solution tablets, epsom salt morphine sulphate tablets, oil of cloves, camphorated tincture of opium potassium permanganate tablets, rhinitis tablets, soap liniment, strychnine sulphate tablets, sulphur ointment, sun cholera tablets spirit of nitrous ether, ointment of zinc oxide

The names of preparations listed by other countries are indexed and described The volume contains an Index which makes it possible to look up preparations under various foreign titles To us it seems a timely compilation and should be useful as indicated in the abstract of the Preface

DONATION OF A VOLUME TO AMERICAN INSTITUTE OF PHARMACY BY L C PARSONS, BOSTON, MASS

The first part of the treatise on minerals, in which is explained the separation of gold from rocks sand, clay and other components of the earth by the use of spirits of salt (hydrochloric acid) which is the only method by which such separation may be effected, and in which is also made known a Panacea or Universal Medicine, antimonial, with explanation as to its use by Hans Rudolph Glauber, translated into French by M Du Teil, Paris, Thomas Lolly Iure Bookstore Rue St Jacques, at the corner of the Rue de Parcheminerie at the Arms of Holland A D, 1659, with the Privilege of the King

PREFACE TO THE READER IN ABSTRACT

The author explains that there are many people who not knowing his experience his travels, etc, have accused him of inability to put into print what he has maintained in regard to his scientific ideas He accuses his enemies of having spread a rumor that either he knows nothing new or that what he knows he has obtained from other people He states that if he were to follow the inclination of his nature he would be too proud to reply to them and would keep silent, but that his better sense and his regard for his fellow men demand that he give to the world the results of his studies Thereafter he explains that many people will not understand him because they are ignorant and that many other people will not want to understand him because they are envious, that for the glory of God and for his love for his fellow man he is determined to give to the world what he knows not in an artful way to please literary dilettants, but with a probity of words so that his great secrets may be understood by those sincerely desirous to know them

The author gives a brief description of his work, Treatise on Minerals," which he divides into three parts Part I, the separation of gold from other metals in rocks, sand, etc Part II the generation and death of minerals and metals Part III, the possibility of the transmutation of metals which the author states is his great desire to accomplish for the glory and benefit of the human race

The Merck Manual of Therapeutics and Materia Medica A source of ready reference for the physician Sixth Edition, Fabrikoid 1379 pages Price $2 Compiled and published by Merck & Co, Inc Rahway N J

"From an original two hundred and fifty pages in 1899, the Merck Manual has grown to one thousand three hundred and seventy nine pages The new edition has been entirely rewritten, yet maintains the characteristics of preceding editions which have made it a standard reference publication for physicians students pharmacists and nurses

'The therapy has been outlined by Dr Bernard Fantus Professor of Therapeutics, College of Medicine at the University of Illinois and has been approached, not only as a science, but as an art For this purpose ripe experience has been culled for the practical application of what has been emphasized so frequently, namely, that the patient should be treated as well as the disease

' This feature of combining savoir faire with medication and accessory regimen represents a departure from stereotyped therapeutics.

In the therapeutic portion of the more than thirteen hundred pages two hundred and fifty seven pathological conditions are presented alphabetically with reference to etiology diagnosis and therapy Over two thousand prescription formulas chiefly covering official constituents with metric system equivalents, are provided These are arranged in numercial sequence with reference to the use of each in the therapy "

THE FOUNDING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

PRESIDENT ROBERT P FISCHELIS, in addressing the New Jersey pharmacists, who were registered on June 28th, used as a text the code of ethics formulated at the time of the organization of the AMERICAN PHARMACEUTICAL ASSOCIATION It has been a practice for several years to have the Governor of New Jersey present the Certificates of Registration and have members of the Board and other pharmacists present The ceremonies should and doubtless do impress the young pharmacists with their responsibilities and the citizens gain confidence from the evidence of regard in which pharmacists hold their profession The code of ethics adopted in 1851 follows

1 To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs and by detecting and exposing home adulterations

2 To encourage such proper relations among Pharmacists Druggists, Physicians and the people at large, as may promote the public welfare, and tend to mutual strength and advantage

3 To improve the science and art of Pharmacy by diffusing scientific knowledge among Pharmacists and Druggists fostering pharmaceutical literature, developing talent, stimulating discovery and invention, encouraging home production and manufacture in the several departments of the drug business

4 To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines

5 To suppress empiricism, and to restrict the dispensing and sales of medicines to regularly educated Pharmacists and Druggists

6 To uphold standard of authority in the Education, Theory and Practice of Pharmacy

7 To create and maintain a standard of professional honesty equal to the amount of our professional knowledge with a view to the highest good and greatest protection to the public

President Fischelis continued

"That was in 1851 If we were to ask any group of practicing pharmacists to day to list the important problems confronting the profession they would unhesitatingly mention every one of the objectives which the organizers of the AMERICAN PHARMACEUTICAL ASSOCIATION set out to attain in 1851 This does not mean that there has been no progress in eighty-three years It does mean, however, that the tasks set by our professional forebears have not yet been completed You who are to receive the sanction of the state to practice pharmacy this morning are therefore entering a field of activity in which much remains to be done In some respects this is very fortunate for you because you will be stimulated by the challenge of unsolved problems and unfinished tasks, and if you can survive the stress of the times economically, I am sure that you will contribute to the continuation of the steady and sound progress which has been made through the decades immediately preceding

"The pharmacists who met in New York in 1851 formed the AMERICAN PHARMACEUTICAL ASSOCIATION which has not only become the outstanding spokesman for the pharmaceutical profession in the United States but has been directly or indirectly responsible for the formation of our state pharmaceutical associations and the various national associations serving specialized fields of pharmaceutical practice such as manufacturing, wholesaling, teaching, etc In short, it is the Mother of Pharmaceutical Associations in America"

F V McCULLOUGH

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII AUGUST, 1934 No 8

FRANK V McCULLOUGH

Frank V McCullough, president of the Conference of Pharmaceutical Association Secretaries for 1934–1935, is a native of the Hoosier State He was born in 1880, reared on a farm and after his earlier education taught in a rural school He entered Purdue University School of Pharmacy, receiving his diploma from that institution in 1905 Thereafter he engaged as clerk in a drug store and from 1907 to 1929 he operated a pharmacy in New Albany, Ind For two years he was a member of H K Mulford Sales force, doing detail work in Louisville territory

In 1927, Mr McCullough was elected full-time secretary of Indiana Pharmaceutical Association and has served in that capacity since then and also as editor of the *Indiana Pharmacist*

He takes an active interest in civic affairs and served as member of New Albany City Council for eight years, as county chairman for six years and secretary of the Congressional District organization for two years

Mr and Mrs McCullough were married in 1906, they have one son

---

OFFICERS OF CONFERENCE PHARMACEUTICAL ASSOCIATION SECRETARIES

President, F B McCullough New Albany Ind *First Vice President* J W Slocum, Indianola Io *Second Vice President* Roy C Reese Topeka Kans *Secretary-Treasurer*, Carl G A Harring, 20 Glen Road Newton Center, Mass *Delegate to the House of Delegates* C J Clayton Denver Colo , *Members of the Executive Committee* J Lester Hayman Morgantown W Va J J Gill, Providence, R I , Roy Reese Topeka Kans W E Bingham [1] Tuscaloosa Ala , *Place of 1935 Meeting*, Portland Ore

[1] Deceased July 10, 1934

EDITORIAL

E G EBERLE EDITOR 2215 Constitution Ave WASHINGTON D C

THE MISSION OF PROFESSIONS

A potent measure in bringing about an understanding of the mission of professions is reasonable, rational discussion, with the purpose of devising the best means for being of service to the public The Pharmacopœia, the National Formulary, "New and Nonofficial Remedies" influence pharmaceutical and medical practice and, reversely, medical and pharmaceutical thought are developed by acquaintance with the standards The attitude of medical practice toward individual drugs should be based on clinical confidence, and the activities of pharmacy should represent the thoughts developed by research in the field of medicine, dentistry and the divisions of pharmaceutical practice and of related sciences

Dr Lewellys Barker, speaking before the Section of Pharmacology and Therapeutics of the American Medical Association, said "Pharmacotherapy is seen at its best when, through the use of a drug, the cause of a disease is removed or rendered harmless (etiologic pharmacotherapy) before the patient has sustained irreparable injuries The organism can then right itself, so that its activities can resume the normal or physiologic course" Neither the Pharmacopœia nor the National Formulary meet all the requirements of medicine and pharmacy, and as a result the "New and Nonofficial Formulas," "Useful Remedies," hospital and dental formularies and the "Recipe Book" issued under authority of representative organizations find a worthy place in the libraries, laboratories and respective professional work rooms

Gratifying progress is being made through cooperative efforts of the members of the several professions The American Medical Association had a display in its scientific section at its recent meeting in Cleveland acquainting its members with the officials of the standards and the preparations representing these drugs The motive of the United States Pharmacopœia booth was the use of the Pharmacopœia in hospital practice and its adaptability to the needs of the practicing physician, in that connection the rules formulated by the New York Hospital, Cornell University Medical College, were brought to the attention of physicians, these may be found in the December JOURNAL, A PH A, 1933, page 1281

Recently a formulary of U S P and N F drugs and preparations has been issued under the auspices of the Philadelphia County Medical Society with the endorsement and cooperation of the Pennsylvania Pharmaceutical Association and the director of the Emergency Relief of Pennsylvania

Splendid work has been done by local associations in bringing into cooperation physicians, dentists and pharmacists, and is evidence of serious thought to raise the professional standard of pharmacy and determination to meet the responsibilities and opportunities in supplying the official preparations The papers of all of the Sections of the AMERICAN PHARMACEUTICAL ASSOCIATION show the trend and a number of them, printed in this issue of the JOURNAL, detail the practice followed by pharmacists and the measure of success achieved by them

Manufacturing pharmacists and chemists have rendered and are engaged in developing and perfecting useful materia medica and their interests as those of medicine, pharmacy and chemistry are largely common interests, in a sense and in degree the work of one branch is incomplete without the other, and full measure of credit is dependent on the recognition of all of them in the welfare of those they serve

Every divisional activity seeks the opportunity for advancement and rendering better service which will gain higher esteem, likewise, there are shortcomings in one way or another, when mutual consideration would result in general good In these columns it has been cited on other occasions that pharmacy has been somewhat over-shadowed by an over-emphasis of the commercial features in some drug stores, as a result, the public has not gained the significance of the professional value of pharmacy, for public opinion is shaped by publicity—pharmacy can be denounced or its importance pronounced—made known by printed word and by the appearance and activities of the drug store Every pharmacist owes it to himself and to pharmacy to aid in acquainting the public with the service rendered by pharmacy and its importance Every opportunity that will lend itself to the purpose should be utilized to acquaint the public with the part pharmacy has in public health service, by informing the people that pharmacists have been the chief exponents of regulations applying to the profession, for its protection against misuse of drugs, and seriously engaged in the development of a materia medica which enables medical men to make the best use of it The earnestness of this cooperation is shown by the growing interest in the discussions and exhibits to the end that therapy may be improved, that among the drugs there are agents which can be employed by physicians with confidence and reasonable expectancy of results Pharmacists are concerned, and their part in the work is not only to supply remedial agents, but also to see that preparations are supplied which represent them most effectively—that is a mission of pharmacy

---

THE CHAIRMAN'S ADDRESS OF THE BRITISH PHARMACEUTICAL CONFERENCE

THE chairman of the British Pharmaceutical Conference, as is well known, does not discuss varied phases of pharmacy but usually selects for his address a subject with which he has been engaged Thus, Chairman C H Hampshire selected for his discussion "Pharmacopœias and Formularies" *The Pharmaceutical Journal*, speaking editorially, said "As Secretary to the British Pharmacopœia Commission he must live most of his life in, as it were, a pharmacopœial atmosphere, where the most important changes are those caused by the advent of foreign and the revision of British Pharmacopœias"

The chairman reviews briefly the pharmacopœias of recent revision The British, Italian, Belgian, Spanish, Danish, Swiss, Yugoslavian, Hungarian, United States, and then discusses the Agreement which resulted from the deliberations of the Second International Conference, held in 1925 The Agreement consists of forty-one Articles, which give consideration or approval to principles of the prepara-

tion of galenicals, a definition of a standard dropper, nomenclature, maximum doses, poison table, etc

The chairman refers to formularies which have been published—the National Formulary, the British Pharmaceutical Codex, the German Erganzungsbuch, the Canadian and the Australian Formulary

The closing theme, while addressed to British pharmacists, has thoughts which have bearing on our own activities Without comment the paragraphs referred to are quoted

' The theme of this address, like that of many others delivered from this Chair, leads to the subject of pharmaceutical research The materials for the construction of pharmacopœias and formularies, provided largely by the papers contributed to this Conference, have proved of value in suggesting subjects to those desirous of contributing something to the sum of pharmaceutical knowledge, and one is led to inquire whether there are any possible extensions of the usefulness of the Conference in stimulating research The organization of cooperative investigations suggests itself as a sphere in which the Conference might carry out valuable work There are many subjects particularly the standardizing of the technique of analytical methods and processes of manufacture which are best investigated by groups of workers who are prepared to experiment with identical material and to pool results

The recent work done by a Committee of the Health organization of the League of Nations in standardizing the technique of the assay of opium provides another instance of successful effort on these lines The formation of the investigating Commissions by the Second International Conference to which reference has been made indicates the appreciation by that assembly of the value of such methods Much good work of this kind was also done by the voluntary efforts of Sub Committees of the British Pharmacopœia Commission with results which were eventually included in the British Pharmacopœia 1932, and it is hoped that similar efforts will continue with much benefit in increasing the value of the Pharmacopœia as a book of standards

' The range could be widened however, and all works of reference would be enriched and increased in value by the inclusion of precise and accurate methods There is need for a central organization which will undertake the collection and distribution of material, the comparison of results and the publication of agreed recommendations I venture to suggest that this Conference might well add to its service to pharmaceutical science by acting, through a Research Committee appointed for the purpose, as an organizing body in relation to pharmaceutical investigation "

In an earlier editorial of the same publication it was asked "Would it be too much to hope that when the Society's (British) new building is erected part will be set aside as the headquarters of pharmaceutical investigations, a National Institute for Pharmaceutical Research, at which inquiries into the pharmaceutical aspects of problems affecting the health of the nation can be made?" The editorial concludes that there was no evident reason why the Society should not provide a research laboratory adequately equipped for its needs

---

PRICE-FIXING UNDER THE NRA

RUSSELL OWEN in discussing various phases of the NRA in the *New York Times* of August 5th, states that nearly all groups have tried to live up to the codes The price-fixing regulations were dropped partly because some industries could not live under them and pay a living wage and because of the difficulties of the enforcement There was difficulty in enforcing the fair practice and price-fixing regulations in the service codes, but there have been requests for reimposing emergency price-fixing to prevent price-cutting and unfair competition It is difficult

or impossible to regulate one group of industries by rules which may not apply fairly to another group

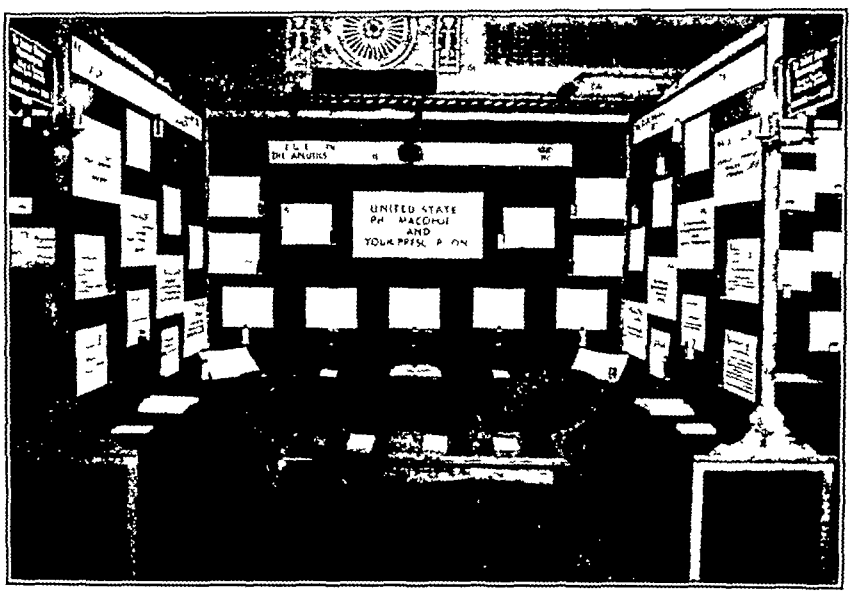
The probability of a merger of the Federal Trades Commission with the NRA is discussed by Mr Owen in the following closing paragraphs

"When General Johnson rewrites the NRA—as he will probably do very soon—some merger of these two bodies will be recommended Since the Trade Commission was created by Congress Congressional action will be necessary to abolish it but its functions may be taken over by NRA by Presidential order

"There are those close to the President who believe that this will be done in the Fall and that the new NRA, stimulator and restrainer of industry at the same time, will start out on a new field of activity which will firmly implant it in the nation's economic system With all its faults, they say, there are few industrialists or labor leaders who want to see it entirely destroyed '

THE 1934 U S P EXHIBIT AT THE CONVENTION OF THE AMERICAN MEDICAL ASSOCIATION

The United States Pharmacopœial Convention authorized the School of Pharmacy of Western Reserve University to prepare a booth on the United States Pharmacopœia for the American Medical Association convention June 11 to 15, 1934, in Cleveland



U S P Exhibit, Cleveland meeting of American Medical Association

The booth was located in the Scientific Section beside that of the AMERICAN PHARMACEUTICAL ASSOCIATION on the National Formulary Across the aisle the School of Pharmacy had its booth on the medicinal plant garden and its work in hospital pharmacy

The prescriptions of the booklet distributed— The U S Pharmacopœia and Your Prescription"—were written upon placards and placed on the walls of the booth Beneath the placards small brackets were fastened to the walls containing bottles of the filled prescriptions

The interest in the displays was very marked and was extremely satisfactory to those in charge of the booths Rarely were there less than five people at the booth at any one time

SCIENTIFIC SECTION

SALIVA TESTS I MORPHINE *

BY JAMES C MUNCH [1]

The formation and secretion of saliva by the parotid, submaxillary and sub lingual glands have been shown to be controlled by the nucleus salivoratus in the upper pons (21, 34, 59) The secretion is readily augmented by sensory stimuli, readily depressed by narcotics Since the volume of saliva excreted daily by man normally amounts to 1000–1500 cc and may be markedly increased, this pathway for excretion of foreign substances appears to deserve study

It is reported that toad and cobra venoms are excreted in the saliva, as well as the virus of rabies and of mumps (5, 6, 7)

Rosenthal (5, 6) in 1893 appears to have been the first to demonstrate that morphine is eliminated in the saliva Therapeutic doses were given to a number of hospital patients The saliva was collected at half-hour intervals, and tested chemically with iodic acid, Husemann's and Froehde's reagents Saliva from a number of normal and pathological individuals not receiving morphine or opium alkaloids gave uniformly negative results When 19 mg were administered daily, saliva tests were negative on the first and second days, then positive until one or two days after the morphine was discontinued The saliva was estimated to contain between 0 05 and 0 2 mg of morphine

A detailed series of experiments on the excretion of medicinal substances by the salivary glands were conducted by Howe (23) Gelatin capsules containing test products were given by mouth and the saliva collected every five minutes for several hours Many products appeared in the saliva within twenty minutes, and their presence was continually detected over a period of nine hours, but not after twenty-four hours Attempts have been made to correlate the salivary excretion of NaCNS and KCNS

The following products have been reported to be excreted in the saliva Aconitine, amino-acids, ammonium compounds, arecoline, atropine, bismuth salts, bromides, brucine, chlorides, chlorates, creatinine, formic acid, glucose, guaiacol cinnamate, histamine, indican, iodides, iron salts, lead salts, menthol, mercury salts, methenamine, morphine, oil of peppermint, ouabain, potassium salts, quinine, salol, sodium benzoate, sodium salicylate, sodium sulphate, strophanthin, strychnine, thiocyanates, tyramine, urea and uric acid The following are reported as not excreted in the saliva Atropine, physostigmine, sodium ferrocyanide and sodium lactate (2, 3, 5, 6, 7, 9, 10, 11, 13, 16, 17, 19, 23, 24, 33, 37, 39, 43, 44, 45, 48, 53, 55, 57, 61, 62, 63, 66, 67, 70, 72, 74)

Saliva tests were developed to detect the "doping" of race-horses Stimulants have been given to race-horses to obtain better (or poorer) performances *Varron*

---

* Scientific Section, A PH A Washington meeting, 1934

[1] Director Pharmacological Research, Sharp and Dohme, Glen Olden, Penna

(69), in 1533, reports that anise seed, honey and sandarach were given to race-horses, as stimulants An English regulation dated June 14, 1666, prohibited the use of exciting substances and methods in races run at Worksop (50) The prohibition of doping has been the subject of various circulars and regulations by racing authorities in Argentine, Austria-Hungary, Belgium, Brazil, Chile, Czechoslovakia, Denmark, England, France, Germany, Italy, Poland, Spain and United States (12, 65) Published information (8, 12, 18, 27, 28, 29, 35) indicates that horses may be stimulated with alcohol, atropine, brucine, caffeine, cocaine, digitalis, heroin, kola nut, nitroglycerin, nux vomica, quinine, scopolamine, strychnine and veratrine Thoroughbred horses are more sensitive to the action of drugs than ordinary work horses (15) Strychnine and cocaine have been used to dope hares for sport in England (32)

The parotid gland of a horse weighs about 400 Gm , the submaxillary 86 Gm and sublingual 23 Gm By cannulating Stensen's duct, 100 to 700 Gm of saliva have been collected from a horse in 15 minutes (54)

Professor S Fraenkel, of Vienna, apparently made the first scientific study of the detection of doping race-horses Theobromine was apparently suggested as the "dope " Studies were made of excretion in the sweat, feces and urine (35, 73) but it appeared that the saliva was the most feasible medium for examination (14) Professor Kaufmann developed a specific chemical technique for testing saliva under race track conditions (3, 4, 27, 28, 29, 71) Based upon his tests, the winners of several large races were disqualified and barred from tracks Neuter (47) states that doping was very common in Belgium Shortly before the World War, chickens of the guardian of the race-track of Stokel invariably died after pecking at the dung of competitors of the previous day

A technique for collecting saliva was developed in France (12) A veterinarian, a representative of the Racing Commission and an assistant lead the horse into a box-stall The veterinarian washes his hands in soap and water, then 95 per cent alcohol and dons sterile gloves A wad of sterile gauze moistened in distilled water is introduced into the mouth of the horse and squeezed over the surface of tongue and lips, the escaping fluid being caught in the collecting basin The tongue, lips and cheeks are then wiped with another piece of gauze An attempt is made to express any saliva from the Wharton canals The gauze and gloves are then placed in a jar, sometimes covered with alcohol, and sealed to prevent tampering with the sample

Chemical methods of detection have been employed with only partial success The method of Fraenkel (14) slightly modified by Lander (36) appears to be an improvement over the standard toxicological processes (1, 49) The saliva is extracted several times with 90 per cent alcohol, plus dilute acetic acid, the filtrate evaporated and extracted with ether This is evaporated to a tacky consistency and exhausted with small amounts of warm absolute alcohol The alcohol is removed and the residue dissolved in hydrochloric acid This solution is made alkaline with sodium bicarbonate and extracted with chloroform and benzene With iodine and Mayer's reagents the limit of sensitivity by morphine was 0 01 mg , with phosphomolybdic acid and gold chloride, 0 001 mg , and with tannic acid 0 02 mg

Chemical methods of procedure may fail in instances where threshold amounts of stimulants have been administered Because tests upon animals are more sensi-

tive, a series of investigations were undertaken to determine their sensitivity for various stimulants which may be used on race-horses Only the results obtained with morphine are reported in this communication

Consideration of the bioassays for morphine (46) suggested the possibility of using the "mouse-tail reaction" (Mauseschwanzphanomens) developed by Straub (64) Mice weighing 15 to 20 Gm are injected with 0 5 cc of test solution under the skin of the back or abdomen If morphine is present the tail soon curves over the back in a characteristic S-curve On stimulation, the mouse becomes somewhat restless, paresis of the posterior extremities becomes more noticeable, the back is humped and the fur stands out in a disheveled, shaggy manner The mechanism of this reaction is still unsettled (20, 22, 25, 26, 30, 31, 38, 40, 41, 42, 51, 56, 58, 60, 64, 68) Other alkaloids may give a somewhat similar response, but different symptoms are produced Positive reactions may be obtained with doses of 0 01 mg of morphine and heroin (46, 56) to 0 02 mg (42) amounts which are far below the sensitivity of chemical procedures on an extract of an organ or on the saliva

Van Rijn (56) reported in 1914 on twenty-five cases of morphine poisoning A corpse was examined and extracts of viscera prepared 59 days after death and again 38 days later The extracted morphine injected subcutaneously under the skin of the back of white mice caused their tails to become stiffly erect in S-shape curves in two to twenty minutes

Maier (42) injected 10 mice at each of a series of increasing doses, from 0 01 mg per 20-Gm mouse to 0 50 mg per 20 Gm (0 5 to 25 mg per Kg) (Table I) The animals showing a questionable reaction were divided arbitrarily, half being considered positive and half negative A definite relationship was found between the dose administered and the duration of the reaction, but this relationship was not as close as the dose percentage response relationship Using the factors of duration and percentage, he tested a series of samples of unknown potency, obtaining results which, in general, were ten per cent less than theory He concluded that this method was suitable for legal and toxicological assays, and had a sensitivity of 0 02 mg of morphine, an amount much less than could be determined by chemical methods Keil and Kluge (31) confirmed the nature of the dose percentage and dose time relationships, using 100 mice at each dose from 1/100 mg of morphine hydrochloride per 10-Gm body weight, down to 1/40 mg (1 to 2 5 mg per Kilo) (Table I) Solutions containing amounts of morphine unknown to the investigator at the time assays were made, were tested with an average error of 6 per cent by the dose percentage reaction, and 2 per cent by the dose time reaction, or an average of 4 per cent For the determination of morphine, 0 0125 mg can be determined with an accuracy of about 5 per cent

A review of the literature showed that about 0 01 mg of morphine may be detected with an accuracy of five per cent by means of the tail reaction of white mice

EXPERIMENTS

In my investigational work preliminary experiments showed that the presence of morphine dissolving in saliva could be detected by the mouse-tail method with the same precision as when morphine had been dissolved in distilled water A large number of tests with differing doses of morphine led to the development of a

specific technique for this test It did not alter experimental results to inject solutions under the skin of the abdomen rather than under the skin of the back, as recommended by previous workers The volume of injected solution did not make much difference in the nature of morphine response produced, but for uniformity it was decided to inject approximately 25 cc of solution per kilo, which corresponds to 0 5 cc for a 20-Gm mouse In those instances where weak solutions were tested and larger volumes injected up to 4 cc per 20-Gm mouse, dependable results were still obtainable, although a somewhat longer time period was usually necessary for the development of the characteristic phenomena

After injection the mice were placed in individual cages in a quiet place and observed every minute or so for a period of half an hour It was arbitrarily decided to fix a time period for reading the results of the injection as fifteen to twenty minutes after injection Those animals which showed positive reactions in five minutes, for example, still showed a positive reaction in fifteen to twenty minutes On the other hand, those animals which showed uncertain responses in fifteen to twenty minutes and gave questionably positive reactions in half an hour when injected with a given dose usually failed to show a consistent response in subsequent trials with the same quantity given to the same animal

The degree of response varied with the dose of morphine injected (1) Doses below the accepted threshold gave evidence of somewhat increased irritability and alterations in respiratory rate, the tail did not leave the ground voluntarily or after stimulation of the back These responses were noted, but considered negative (2) Threshold doses producing the satisfactory response caused definite alterations in respiratory rate The mice tended to stand with the back arched and head depressed When they were gently stimulated by a current of air or stroking the back with a lead pencil, the back became more arched The hair tended to stand out in a shaggy manner The posterior limbs showed rapid fibrillary twitchings tending toward paresis and the tail was lifted from the floor of the cage to or toward a definite S curve After the stimulus was discontinued, the tail reaction and the appearance of the posterior extremities extended for several seconds to several minutes (3) When a supramaximal dose was administered, a very rapid development of the characteristic symptoms was followed by marked apnea, the fibrillations tending to extend to the anterior portions of the injected animals and the tail response developing normally without external stimulus and persisted for some time In conformity with the literature findings, the duration of the effect was roughly proportional to the dose administered One mouse in Fig 1 shows the supramaximal effect, another shows the threshold

Fig 1 —Tail response of mice after injection of morphine derivatives

The procedure, based on my experiments, was outlined Weigh a series of mice of either sex with an accuracy of one gram, inject morphine solution in a dose of approximately 25 cc per kilo subcutaneously under the skin of the abdomen, place injected animals in a quiet place Between fifteen and twenty minutes after

injection of the threshold dose gentle stimulation produces arching of the back, posterior partial paresis and elevation of the tail to or toward an S-curve A number of animals (at least ten) should be injected, after preliminary tests have indicated an approximate threshold concentration Animals should show a positive response within 15–20 minutes in determining the threshold dose

In applying this procedure to the determination in the saliva of horses, a series of trials have been made Collections of about 2 cc of saliva from each of fifty horses not injected with morphine were made, 1 cc and, in many instances, 2 cc of each saliva were injected by the method outlined, and no response obtained This appears to justify the conclusion that the normal saliva of a horse not injected with morphine does not give symptoms suggesting a tail reaction A series of doses of morphine, ranging from 100 mg to 1 Gm per horse were then injected, in general, the horses weighed about one thousand pounds Typical results of this test are given in Table II

No chemical tests were made upon the samples of saliva In each instance a control sample of saliva was collected immediately before the injection, then saliva samples taken fifteen minutes and thirty minutes after injection In some instances samples of saliva were collected at periods greater than thirty minutes after injection, but in general, the results obtained with them were in agreement with the results obtained at the thirty-minute interval Injection of saliva in the pre-

TABLE I —MOUSE TAIL RESPONSES AFTER INJECTION OF MORPHINE, LITERATURE DATA REARRANGED

Dose Mg /Kg	Per Cent of Mice Showing Positive Reactions		
	Maier	Keil & Kluge	Munch
0 5	16		
1 0	53		0
1 11		8	
1 25		20	1
1 43		39	
1 67		60	5
2 0	79	85	10
2 5	91		20
3 0	100		31
4 0			40
5 0	100		65
6 0			90
7 0			100

TABLE II —TYPICAL PROTOCOL MOUSE TAIL TEST ON HORSE SALIVA

Horse No	Amount Morphine		Results of Saliva Collected Various Periods after Injection.				
	Mg per Horse	Mg /Kg	0 Min	15 Min	30 Min.	45 Min	60 Min
141	100	0 22	Neg	Neg	Neg	Pos	
9325	200	0 45	Neg	Pos	Pos	Pos	Pos
9971*	200	0 45	Neg	Pos	Pos	Pos	Pos
9949	250	0 55	Neg	Neg	Pos		
9112*	300	0 66	Neg	Neg	Pos	Neg	Pos
9326	400	0 88	Neg	Pos	Pos	Pos	Pos
9975	500	1 10	Neg	Neg	Pos		
9321*	800	1 75	Neg	Pos	Pos	Pos	Pos
X	1000	2 20	Neg	Pos	Pos	Pos	Pos

* 1/4 grain arecoline

liminary tests was made in doses of 0 25, 0 5 and 1 cc into each of three mice Based upon these results, further samples were injected in proper dilutions, as indicated

No effort was made to follow through a complete collection of saliva at various intervals after injection in order to obtain the absolute amount of morphine quantitatively eliminated in the saliva This rather complicated problem is being considered and will be reported subsequently No difficulty was encountered in detecting morphine in the saliva of horses that had received subcutaneous injections of 100 mg of morphine sulphate per 1000 pounds of horse (approximately 0 2 mg per kilo body weight of horse, or $1^1/_2$ grains of morphine sulphate per horse) The therapeutic dose of morphine for a horse (15) is listed as 0 3 to 0 6 Gm It would, therefore, appear that after the administration of large therapeutic doses of morphine its presence might be detected in the saliva over a period of half an hour Doses of morphine suggested for "doping" race-horses correspond to 3 to 5 grains of morphine sulphate per horse, amounts which may be detected by this procedure, even without attempting to concentrate the saliva If the saliva is concentrated by chemical procedure, the sensitivity may be greatly increased The administration of $^1/_4$ grain of arecoline per horse increased salivation, but did not appear to affect the elimination of morphine

CONCLUSIONS

1 Morphine may be quantitatively determined by the mouse-tail reaction

2 The amounts used in "doping" race-horses can be readily detected in the saliva fifteen and thirty minutes after administration

3 A standardized technique has been developed for this test

BIBLIOGRAPHY

(1) W Autenrieth and W H Warren 'Laboratory Manual for the Detection of Poisons and Powerful Drugs " 6th American Edition, 1928

(2) G Bachman and A R Bliss, ' Essentials of Physiology and Pharmaco-Dynamics," 2nd Edition (1926) 202

(3) G Barkan and W Leistner, ' Uber das Jod in Blut und Drüsensekreten nach Jodeiweissfütterung," *A E P P*, 144 (1929), 83–104

(4) Barrier, ' Contre le Doping " *Rec Med Vet*, *Alfort* (June 1913), 425, through Reference No 12

(5) F Bottazzi and V Valentini The Poison of the Saliva of Octopus macropus," *Arch sci biol*, 6 (1924) 153–168

(6) Boucherson, "Excretion of Uric Acid in Saliva " *Compt rend acad sci*, 100 (1885), 1308, through Reference No 43

(7) T L Brunton, "Text Book of Pharmacology, Therapeutics and Materia Medica" (1885), 316

(8) Carpentier, through Reference No 12

(9) L Chelle, The Normal Thiocyanates of the Organism," *J soc pharm Bordeaux*, 58 (1920), 20–54

(10) A J Clark, 'Applied Pharmacology " 2nd Edition (1927), 193

(11) W E Dixon Practical Pharmacology (1920)

(12) Jean Faillie Recherches Chimiques Physiologiques, Toxicologiques sur la Brucine Application au Doping," Thesis Paris (1929)

(13) S Fenwick ' The Saliva as a Test for Functional Disorders of the Liver" (1887), J & A Churchhill, London

(14) S Fraenkel, 1911, through Reference No 12

(15) E Frohner, "Arzneimittellehre fur Tierarzte," 12th Edition (1921), 63

(16) D Ganassini, "Rapid Detection of Bismuth in Urine and Saliva," *Boll chim farm*, 61 (1922), 321–326

(17) A Gruber, *Deut Arch klin Med* 69 (1901), 243

(18) Gubbins, "Dopes A Criticism of American Arts and English Efforts, 1901," through Reference No 12

(19) P J Hanzlik, The Excretion of Hexamethylenamin in the Saliva " *J A M A*, 54 (1910), 1940

(20) W J R Heinekamp, The Mechanism of the Straub Biologic Test for Morphine," *J P E T*, 20 (1923) 107–113

(21) V E Henderson, ' The Action of Drugs on the Salivary Secretion," *J P E T* 2 (1910), 1–13

(22) Hermann *Biochem Z*, 39 (1912), 216

(23) P R Howe, ' Experiments Showing the Excretion of Medicinal Substances through the Salivary Glands " *Dental Cosmos*, 55 (1913), 37–39

(24) K J Huber Uber die Ausscheidung subkutan einverleibter alkaloids durch die Magenschleimhaut und die Speicheldrusen ' *A E P P*, 94 (1922), 327–351

(25) T Ikoma, "Experimentelle Analyse des durch Morphium erzengten Blasen Sphink terkrampfes " *Ibid* 102 (1924), 145–166

(26) V Jensen and F L Rumry Straub's Biologic Test for Opium Alkaloids," *J P E T*, 11 (1918), 178

(27) Kaufmann, "Precis de Therapeutique Veterin " Paris, 1901, through Reference No 12

(28) Kaufmann, 1903, through Reference No 12

(29) Kaufmann ' La Cocaine," *Rec Med Vet Alfort* (1908) 81

(30) W R von Kaufmann Asser, Uber die Ausscheidung des Morphins im Harn," *Biochem Z*, 54 (1913), 161

(31) W Keil and A Kluge, 'Uber die Anwendung des Mausechwanzphanomens zur Auswertung von Morphin- und Skopolaminpräparaten " *A E P P* 174 (5/6) (1934), 493–501

(32) K Kirk *Vet Record* (Mar 2 1929) through Reference No 12

(33) R Kobert, ' Lehrbuch der Pharmaco-Therapie," 2nd Edition (1908), 54

(34) Kohnstamm *Verhandl XX Kongress Innere Med* (1902), 361, through Reference No 21

(35) M Kossa, through Reference No 12

(36) G D Lander, The Micro Detection of Alkaloids ' *Analyst* 55 (1930), 474–476

(37) L Lattes ' Indican in Organic Liquids and Its Test for the Identification of Urine " *Arch farmacol sper* 28 (1919), 4–22

(38) von Leersun, *Physiol Abstracts*, 3 (1918), 460

(39) W Lipschitz The Significance of Internal Circulation' for Crystalloids, Particularly Iodide," *Klin Wochschr*, 8 (1929), 116–117

(40) D I Macht *Proc Soc Exptl Biol Med*, 17 (1919), 100

(41) D I Macht ' A Pharmaco-Dynamic Analysis of Straub's Morphine Reaction ' *J P E T*, 15 (1920) 243

(42) L Maier, Quantitative Morphinbestimmung mit Hilfe des biologischen Versuches " *A E P P*, 161 (2) (1931), 163–172

(43) A P Mathews, ' Physiological Chemistry " 2nd Edition (1916), 336

(44) H H Meyer and R Gottheb, Experimental Pharmacology " 2nd Edition (1926), 186

(45) J L Morris and V Jersey, Chemical Constituents of Saliva as Indices of Glandular Activity," *J Biol Chem* 56 (1923), 31–42

(46) J C Munch, "Bioassays a Handbook of Quantitative Pharmacology" (1931)

(47) (De) Neuter, ' Le Turf anecdotique, ' Paris, 1925–1926 through Reference No 12

(48) von Noorden and Fischer, 'Berlin," *Klin Wochschr*, 53 (1916), 1076, through Reference No 44

(49) F Peterson, W S Haines and R W Webster, 'Legal Medicine and Toxicology," 2nd Edition (1923)

(50) C M Prior, ' Early Records of Thoroughbred Horses," London (1924), through Reference No 12

(51) P Pulewka, "Der Wirkungscharakter des Morphins an der weissen Maus," *A E P P*, 123 (1927), 259–271

(52) Rassers, *Physiol Abstracts*, 2 (1917), 189

(53) F Rathery and L Binet The Saliva in Diabetes " *Presse Med*, 28 (1920) 263, through Reference No 70

(54) Richet, ' Dictionnaire de Physiologie '

(55) D Riesman, Diseases of the Mouth and Salivary Glands," through Osler's Modern Medicine, ' 5 (1908) 39–76

(56) W Van Rijn, 'Chemical, Physical and Physiological Determination of Morphine in Toxicology," *Compt rend internat pharm Cong* 762, YEAR BOOK A PH A, 3 (1914) 547

(57) Julius Rosenthal, Uber die Ausscheidung des subkutan injizirten Morphinum durch den Speichel," *Berlin Klin Wochschr*, 30 (1893) 1189–1192 *Deut Med Zeit* (1893), 511

(58) Rubseman, *A E P P* 59 (1908), 234

(59) A Scheunert and A Trautmann, 'Zum Studium der Speichelsekretion," *Arch ges Physiol*, 192 (1921), 1–32

(60) W von Schroeder, "Untersuchungen uber die pharmakologische gruppe des morphins," *A E P P*, 17 (1883), 96

(61) T Sollmann, ' Manual of Pharmacology," 4th Edition (1932) 80

(62) De Souza *J Physiol*, 35 (1907), 332 through Reference No 21

(63) E Starkenstein, E Rost and J Pohl "Toxikologie' (1929) 5

(64) Straub, *Deut med Wochschr*, 37 (1911) 1462

(65) Suckow, ' Das Doping " *Der Preuss Kreistieranrzt*, 4 (1905), through Reference No 12

(66) Sullivan and Jones, *P H R*, 34 (1919) 1068 through Reference No 70

(67) A S Taylor, ' On Poisons, ' 3rd Edition (1875)

(68) H Thoms, "Betaubungsmittel und rauschgifte' (1929)

(69) C Varron, *De l'Agriculture*, Paris (1533), through Reference No 12

(70) R Webster, ' Diagnostic Methods " 7th Edition (1923), 38

(71) Wolff and Pfyl, through Reference No 12

(72) E Zak, "Uber Jodausscheidung im Speichel bei Gesunden und Kranken " *Wien klin Wochschr*, 47 (1919), 2293

(73) Zanders, 'L'etat Actuel de la Question du Doping," through Reference No 12

(74) E Zunz 'Elements de Pharmacodynamie Generale" (1930), 181

ABSTRACT OF DISCUSSION

W B D Penniman said he would discuss this report by Dr Munch, in view of the fact that we are collaborating on this race track work, to a certain extent 'It must be remembered that the collection of saliva from a race horse is not a quantitative procedure, although a specific technique has been developed for this purpose. The race horse is most emphatically *not* a laboratory animal After the sample is obtained the toxicological difficulties develop because of the presence of iron from the bit, traces of blood and other substances which may interfere with our tests By a chemical method I have succeeded in detecting or identifying fractions of a mg of the morphine alkaloids caffeine, strychnine and cocaine These are only four of the substances which we have to seek Everybody who has worked on this subject to date seems disposed to keep it a secret If any chemist or any pharmaco ogist is interested in this matter, I know I am speaking for Dr Munch as well as my own organization in saying we will be glad to confer with them and get, as well as give any possible assistance In making saliva tests at this time, the chemist is in a little better shape than the pharmacologist Tests upon the saliva by chemical and pharmacological methods may be depended upon to show whether horses have been 'doped ' "

F A Upsher Smith said that this matter is of tremendous importance because when you

find harmful poisons in a horse's mouth after a race, you are questioning the honor of the men who own and train the horses ' The work Dr Munch is doing is a credit to him and to the country, because all decent racing men will appreciate the fact that it is only the rotters' who are doping their horses and the good men don't want it I would like to suggest that the perspiration from under the saddle would be a more handy substance to use than the gooey saliva The favorite mixture for doping horses is nitroglycerin, strychnine, digitalis and heroin Is it possible to get an accurate result between the time the horse comes back from weighing in and the time he returns to the stable?"

The author stated that the chemical methods developed by Dr Penniman are much more sensitive than those published in the literature and he deserves to be commended for his studies on this subject We are uncertain whether the chemical or biological methods are the most delicate, as well as the most specific, for testing the horse's saliva With the animal test you get definite symptoms more rapidly than with the chemical with the chemical method you can often isolate the specific alkaloids and identify them The combination of both methods appears highly desirable I have had no experience with perspiration from under the saddle, but believe that it might be contaminated with too much dirt It is hoped that the application of these methods of chemical and biological testing will stop the doping of race horses "

THE STABILIZATION OF SYRUP OF FERROUS IODIDE, U S P X

BY WILLIAM J HUSA AND LYELL J KLOTZ

(*Concluded from page 683, July Journal*)

As indicated in Table II, the hydrolysis of aqueous solutions of ferrous iodide corresponds predominantly to the equation

$$FeI_2 + HOH \rightleftharpoons Fe(OH)I + HI$$

and apparently, two equilibria exist since reasonably constant values of K_1 were obtained for solutions having either a p_H of 3 2 or 4 1 In the former case, the degree of hydrolysis is approximately 0 30% at the concentration of the U S P Syrup, in the latter instance, it is approximately 0 027% Solutions of ferrous iodide of p_H 4 1 are hereafter designated as solutions at primary equilibrium, those at p_H 3 2 are considered to be at a condition of secondary equilibrium

The Mechanism of Iodine Formation —The decomposition of aqueous solutions of ferrous iodide consists in the formation of free iodine and ferric hydroxide If sucrose, or other peptizing agent is present, however, ferric hydroxide does not precipitate and the appearance of iodine is dependent upon the rate at which the peptizing agent reacts with free iodine as well as upon the rate of auto-oxidation The presence of soluble ferric ion is prohibited by the presence of iodide ion which reduces it to the ferrous state

Several equations to account for the decomposition of ferrous iodide preparations have been advanced Salzer (9) and Sadtler and Coblentz (10) formulated the equation

$$(I) \qquad FeI_2 + 2HOH + {}^1/_2 O \rightleftharpoons Fe(OH)_3 + HI + I$$

Mylius (11) suggested

$$(II) \qquad 2FeI_2 + 3O_2 + 3HOH \rightleftharpoons 2Fe(OH)_3 + I_2$$

and Bentley and Driver (12) account for the decomposition by two reactions

$$(III) \quad 2FeI_2 + O_2 \rightleftharpoons 2FeOI + I_2$$
$$(IV) \quad FeOI + 2HOH \rightleftharpoons Fe(OH)_3 + HI$$

On the other hand, Phillips (13) believed the decomposition to result from deterioration of the hydriodic acid formed by hydrolysis of the salt, no experimental evidence was offered in support of this hypothesis

The above equations require, from a stoichiometric standpoint, the loss of two mols of ferrous iron for each mol of free iodine formed Equations (I) and (IV) indicate, however, that this ratio would decrease slightly as the result of subsequent deterioration of the hydriodic acid formed Thus, the validity of these equations may be established by analyses of partially decomposed solutions of ferrous iodide, a 2 1 ratio or smaller indicating that such formulations are acceptable

In order to determine the validity of these theories of decomposition, samples of aqueous solutions of ferrous iodide were stored under conditions of excess air, in completely filled, tightly stoppered bottles and in sealed pycnometers and the loss of ferrous iron in mols per liter compared with the free iodine present The result of such a series of analyses upon a sample stored in the presence of air and prepared from Reagent grade chemicals follows in Table III

TABLE III —RATIO OF MOLARITY OF IRON AND IODINE IN AQUEOUS SOLUTION OF FERROUS IODIDE STORED AT 30° C IN THE PRESENCE OF EXCESS AIR

Hours.	Loss Fe^{++} Mols/L	I_2 Mols/L	Fe^{++}/I_2
0			
172½	0 00772	0 00144	5 36
240	0 00799	0 00177	4 52
292	0 00705	0 00197	3 58
340	0 00705	0 00220	3 20
384	0 00705	0 00313	2 26
436	0 01089	0 00337	3 21
557	0 01614	0 00418	3 86
774	0 02094	0 00561	3 72
918	0 02093	0 00666	3 14
1178	0 01983	0 00897	2 21
1538	0 03675	0 01300	2 82

As indicated by the data in Table III, no evidence exists for the disappearance of 2 mols of ferrous iron per mol of iodine formed Moreover, similar results were obtained in other samples stored in the presence of air Samples stored in completely filled, tightly stoppered bottles apparently remained near the condition exemplified by the early readings in Table III, and ranged in ratio between 8 64 and 2 21 as determined from 11 analyses Samples stored in sealed pycnometers, showed no loss of ferrous iron over a period of 1127 hours although they contained traces of free iodine It was concluded that the equations previously advanced were not acceptable as representing the mechanism of decomposition

An examination of the precipitates contained in the samples of solution stored in completely filled, tightly stoppered bottles gave some indication of basic salt formation during the early stages of decomposition In general, however, the precipitate proved to be ferric hydroxide

In order to test the effect of a common ion on the rate of decomposition, a solution containing 1 mol per liter of potassium iodide in addition to its ferrous

iodide content and another solution containing 0 22 mol per liter of excess ferrous sulphate were stored together with a control Analyses for free iodine showed that the presence of either iodide or ferrous ion in excess results in an increased rate of decomposition

The Rate of Decomposition of Ferrous Iodide Solutions—In order to elucidate further the mechanism of decomposition of aqueous solutions of ferrous iodide, the rate and order of reaction were determined A solution of ferrous iodide was prepared from Reagent chemicals and stored in the thermostat at 30° C in darkness in a container with an excess of air The progress of the decomposition was followed by titration of the liberated iodine Results were treated mathematically according to equations (I) and (II) below, in order to determine the order of reaction (14)

$$\text{(I)} \qquad K_m = 2\,303/t \log a/a - x$$
$$\text{(II)} \qquad K_b = 1/t\, x/a(a - x)$$

where K_m represents the specific reaction rate as calculated for a first order reaction and K_b represents that for a second order reaction The fraction decomposed in time t is represented by x, and the initial concentration by a All calculations are based upon the total iodide content of the preparation, thus regarding the oxygen content as sufficiently large to be considered constant Data follow in Table IV

TABLE IV —RATE OF DECOMPOSITION OF FERROUS IODIDE SOLUTIONS PREPARED FROM REAGENT IRON AND REAGENT IODINE AND STORED IN THE THERMOSTAT AT 30° C IN DARKNESS

Total Hours	Segment Hours	Iodide Mols/L	Ferrous Iron Mols/L	Iodine Mols/L × 10^3	$K_m \times 10^5$	$K_b \times 10^4$
0	0	0 22710	0 2348			
95	95	0 22672	0 2354	0 87	4 05	1 79
148½	53½	0 22648	0 2348	1 22	1 51	4 46
215	66½	0 22710	0 2334	1 43	1 06	4 20
263	48	0 22680	0 2244	1 63	0 98	6 65
315½	82½	0 22672	0 2263	1 83	1 74	6 86
359	43½	0 22680	0 2263	1 99	1 74	8 98
411	52	0 22651	0 2263	2 72	1 80	10 29
532	121	0 22694	0 2244	3 41	1 32	5 57
719	187	0 22643	0 2159	4 46	1 29	4 73
863	144	0 22643	0 2165	5 03	2 76	6 95
1123	260	0 22620	0 2155	6 38	2 38	4 92
1483	360	0 22679	0 2094	7 89	1 89	4 42
2400	917	0 22683	0 2052	11 55	1 84	2 60
3120	720	0 22659	0 2003	14 35	1 82	1 14
					Mean 1 79	

As indicated in Table IV, the values of K_m are in good agreement while those of K_b show considerable variation The iodide content, including free iodine present, remained practically constant For the 14 values of K_m given, the standard deviation (S D) is 0 72 × 10^{-5}, the standard deviation of the mean is 0 19 × 10^{-5}, the probable error (PE), is 0 48 × 10^{-5} and the probable error of the mean is 0 13 × 10^{-5}

As further verification of the order of reaction, three samples of aqueous solu-

tion of ferrous iodide, prepared from card teeth and Reagent iodine and differing in concentration were stored under the conditions outlined above and the rate of reaction determined The data are shown in Table V

TABLE V —RATE OF REACTION OF AQUEOUS SOLUTIONS OF FERROUS IODIDE PREPARED FROM CARD TEETH AND REAGENT IODINE AND STORED IN THE THERMOSTAT AT 30° C IN DARKNESS

Conc FeI_2 Mols/L	No of Det ns	Total Hours	$K_m \times 10^5$ Mean	S D of $K_m \times 10^5$	$K_b \times 10^5$ Mean	S D of $K_b \times 10^5$
0 47935	9	3048	3 21	0 27	23 91	11 43
0 22594	17	3007	3 22	0 76	6 86	3 36
0 11770	6	2086	3 88	0 25	63 30	15 21

It was concluded from the data shown in Table V that the first order reaction equation is applicable to this decomposition The standard deviation of the mean at the concentration of the U S P Syrup being $0\ 18 \times 10^{-5}$, the mean may be stated as $3\ 22 \pm 0\ 18 \times 10^{-5}$

The rate of decomposition for card teeth solutions is greater than for solutions prepared from Reagent iron, nearly twice as much iodine being formed per hour in terms of per cent decomposition per unit time

The Effect of Type of Glass upon the Rate of Decomposition —Containers used for determination of the rate of reaction as shown in Tables IV and V, imparted alkalinity to distilled water upon standing To ascertain the effect of a container imparting no alkalinity to glass, similar determinations were made upon an aqueous solution of ferrous iodide stored under conditions identical with the above, in such a container (Pyrex bottle) Ten analyses were made upon the solution which assayed 0 22693 mols/L of ferrous iodide These determinations were made over a period of 1675 hours The mean value for K_m was $6\ 96 \times 10^{-5}$, the standard deviation was $0\ 57 \times 10^{-5}$, the standard deviation of the mean was $0\ 18 \times 10^{-5}$ Thus K_m may be stated as $6\ 96 \pm 0\ 18 \times 10^{-5}$

It was concluded that the type of glass in the container exerted a marked effect upon the rate of decomposition, alkaline glass exerting a retarding effect

During the progress of this investigation, alkaline glass was employed in order to obtain results directly applicable to common pharmaceutical containers

The Effect of Surface Area upon the Rate of Decomposition —Since decomposition of aqueous solutions of ferrous iodide requires oxygen, it is probable that the rate of reaction would depend directly upon the rate of oxygen absorption, provided auto oxidation is appreciably more rapid than absorption This rate of absorption would in turn depend to some extent upon the surface exposed, *i e*, the reaction would be of the zero order

In order to extend the previous determinations of reaction rates to include conditions of minimal practical surface area exposed, an aqueous solution of ferrous iodide was stored under conditions identical with those of previous reaction rate determinations In this case, however, a container was chosen of such shape that only about $1/5$ of the previous surface exposure occurred This container was typical of common prescription bottles Ten determinations of the rate of reaction over a period of 2986 hours gave a mean value for K_m of $3\ 15 \times 10^{-5}$ The standard deviation was $0\ 37 \times 10^{-5}$ and the standard deviation of the mean was $0\ 11 \times 10^{-5}$ Thus, K_m may be stated as $3\ 15 \pm 0\ 11 \times 10^{-5}$

It was concluded that under ordinary conditions, the absorption of oxygen is more rapid than auto-oxidation and that, therefore, the reaction is not one of the zero order

The Effect of Limited Availability of Oxygen —Fifty samples of aqueous solution of ferrous iodide were stored in darkness in the thermostat at 30° C , in completely filled, tightly stoppered bottles Stoppers were protected from the action of iodine and the containers sealed with paraffin A sample was removed and assayed for iodine content at intervals over a period of 3122 hours Variable results, ranging from $1\ 90 \times 10^{-4}$ mols/L to $9\ 51 \times 10^{-4}$ mols/L of free iodine, were found present in 14 determinations It is significant that low values were impartially distributed over the duration of the experiment

It was concluded from the distribution and magnitude of the results, that upon expiration of the contained oxygen, little decomposition occurs in aqueous solutions of ferrous iodide stored without access to atmospheric oxygen

A series of samples of aqueous solution of ferrous iodide was next stored in sealed pycnometers All water used in the preparation was vigorously boiled before use and allowed to cool in completely filled, tightly stoppered bottles No precipitate appeared in these samples during 792 hours The value of K_m was $2\ 59 \times 10^{-6}$ Bubbles of gas appeared at the surface of the liquid in these preparations but did not appear in solutions of ferrous sulphate similarly prepared and stored It appears probable that a slow secondary decomposition occurs in the absence of oxygen according to the equation

$$2HI \rightleftharpoons H_2 + I_2$$

The Effect of Viscosity upon the Rate of Decomposition —As a means of determining the effect of viscosity upon the rate of auto oxidation of solutions of ferrous iodide, aqueous solutions of the salt were rendered viscous with tragacanth and the rate of reaction evaluated in terms of the specific reaction rate, K_m Tragacanth was chosen as being a neutral non-reactant carbohydrate Viscosities were determined by means of viscosimeter tube and stop-watch (15) Preliminary experiments showed that tragacanth in the concentrations used was without effect upon free iodine during the duration of the experiments Table VI shows the data obtained Values of a solution without added tragacanth are from Table V

TABLE VI —RATE OF DECOMPOSITION OF AQUEOUS SOLUTIONS OF FERROUS IODIDE RENDERED VISCOUS WITH TRAGACANTH AT 30° C

Conc of FeI_2 in Mols/L	Relative Viscosity (30°/30°)	No of Det ns	Time Hours	$K_m \times 10^5$ Mean	S D $\times 10^5$	$K_m \times 10^5$
0 22594	1 072	(See Table V)		3 22	0 25	3 22 ± 0 18
0 22811	2 507	5	1227	1 73	0 10	1 73 ± 0 04
0 22783	6 296	5	1227	1 01	0 01	1 01 ± 0 01
0 21323	19 8	5	1848	1 05	0 07	1 05 ± 0 03
0 21490	539 7	5	1848	0 79	0 02	0 79 ± 0 01

As indicated in Table VI, increases above a relative viscosity of approximately 6 have little effect upon the specific reaction rate From these data it was concluded that the specific reaction rate is a hyperbolic function of the viscosity or of some factor proportional to viscosity

The Effect of Variations in Temperature upon the Rate of Decomposition of Aqueous Solutions of Ferrous Iodide—In order to determine the effect of variations in temperature upon the auto-oxidation rate of aqueous ferrous iodide solutions, samples of various viscosities were stored in the oven at 50° C ± 2° and in the refrigerator at 6° C ± 1° All samples were stored in containers with an excess of air Reaction rates were determined in the usual manner, viscosities are stated relative to water at 30° C although determined at the reaction temperature, and tragacanth was used as the substance imparting viscosity Data in Table VII referring to solutions at 50° C were determined after short intervals of exposure since the solutions increased greatly in viscosity with time These results, therefore, are only approximate

TABLE VII—THE EFFECT OF VARIATION IN TEMPERATURE UPON THE SPECIFIC REACTION RATE OF AQUEOUS SOLUTIONS OF FERROUS IODIDE OF VARIOUS VISCOSITIES

Conc FeI₂ Mols/L	Relative Viscosity	Temp °C	Total Hours	No of Det ns	Mean $K_m \times 10^4$	S D $\times 10^4$	$K_m \times 10^4$
0 22690	1 062	50	575	5	3 21	0 27	3 21 ± 0 12
0 22525	1 200	50	68	1	1 25		
0 22811	2 26	50	336	1	0 60		
0 22383	5 13	50	336	1	0 59		
0 21225	26 74	50	1126	5	0 61	0 19	0 61 ± 0 01
0 22690	1 075	6	1012	5	0 38	0 05	0 38 ± 0 02
0 22810	64 32	6	840	3	0 22	0 005	0 22 ± 0 003
0 22380	89 68	6	840	3	0 10	0 04	0 10 ± 0 002
0 21007	525 0	6	1152	3	0 35	0 02	0 35 ± 0 01

It was concluded that solutions of ferrous iodide at 50° C have a temperature coefficient of approximately 3 for each ten degree rise in temperature The curve of viscosity against reaction rate is hyperbolic and the greatest variation is between relative viscosities of 1 and 26 At 6° C, however, the reaction is more rapid than at 30° C, and the curve of viscosity against specific reaction rate is nearly linear for relative viscosities below 100

The Effect of Light upon the Rate of Decomposition of Aqueous Solutions of Ferrous Iodide—That light catalyzes the auto-oxidation of iodide ion has long been known and Berthoud and Nicolet (16) have shown that all light from the visible spectrum is active It has not previously been shown, either that the decomposition of ferrous iodide is typical of iodide ion, with respect to the catalytic effect of light, or is sensitive to certain spectrum bands To evaluate this factor, aqueous solutions of ferrous iodide were stored in containers with excess air, behind a series of light filters in direct sunlight, and a control run with the experiment No s ificant difference in specific reaction rate could be found in any sample, althou the auto-oxidation proved to be more rapid than in solutions stored in darknes ider similar conditions of heat and exposure It was concluded that the auto oxidation of ferrous iodide is catalyzed by all rays of the visible spectrum and is thus typical of iodide ion oxidation

The action of ultraviolet light was evaluated indirectly The specific reaction rate of solutions stored in sunlight in quartz flasks was compared with that for solutions similarly stored in pyrex Since results were identical, it is probable that ultraviolet light has no catalytic effect upon this decomposition

The Appearance of Permanent Dark Coloration in Syrup of Ferrous Iodide—Obviously, the liberation of free iodine in Syrup of Ferrous Iodide results in dark coloration, this, however, seldom occurs due to the hypophosphorous acid content of the preparation Nevertheless, the Syrup, upon standing, assumes a very dark brown or black color rendering it unfit for use Since neither aqueous solutions of ferrous iodide nor aqueous solutions of ferrous iodide containing hypophosphorous acid show this phenomenon, the discoloration must be ascribed to the presence of sucrose or its decomposition products The change has commonly been misnamed caramelization

Preliminary experiments showed that either ferrous ion as ferrous sulphate or hypophosphorous acid was capable, the latter much more efficiently than the former, of producing a dark coloration in simple syrup if present in the proportions found in the U S P Syrup of Ferrous Iodide Phosphoric acid also possesses this property, but free iodine was slowly and completely decolorized

Samples of Syrup of Ferrous Iodide with the hypophosphorous acid omitted, stored in direct sunlight or in the oven at 50° C rapidly became black in color and contained a black precipitate Thus hypophosphorous acid does not cause this change to occur although it may act as a catalyst

Sucrose, upon inversion, forms equimolecular quantities of dextrose and levulose, and Krantz (17) has shown that inversion is 96 2% complete in Syrup of Ferrous Iodide in 20 days Accordingly, samples of Syrup of Ferrous Iodide were prepared, substituting in one case 2 484 mols/L of Merck's C P dextrose for the sucrose, and in the other, 2 484 mols/L of Cenco pure levulose In one month's exposure in the oven at 50° C , in the presence of air, the sample containing levulose was black, that containing dextrose was yellow, but no darker than a sample of simple syrup containing an equivalent quantity of ferrous sulphate and stored under the same conditions Similarly, samples of U S P X Syrup of Hydriodic Acid also turn black in color under these conditions This Syrup contains hypophosphorous acid

It was concluded that levulose, formed by hydrolysis of the sucrose present in the official Syrup, is the cause of the dark coloration appearing in Syrup of Ferrous Iodide

The Effect of Various Preservatives upon Free Iodine—The action of any preservative or stabilizer in Syrup of Ferrous Iodide may be twofold it may decrease the rate of auto-oxidation and it may cause the disappearance of free iodine Adding the stipulation that it must not cause side reactions to occur, gives three criteria for the evaluation of preservatives from a chemical standpoint Thus a substance may act as a stabilizer under one of these criteria, yet be rejected on the basis of another Sucrose is typical of this class

In order to evaluate various stabilizers on the basis of their action on free iodine, solutions containing approximately 0 01 mols/L of free iodine as Compound Solution of Iodine, U S P X, and 2 484 mols/L of the preservative were stored in darkness with excess air in the thermostat at 30° C Free iodine was determined at intervals A control showed no loss of iodine during the duration of the experiment The value 2 484 mols/L was used to give results directly comparable with sucrose, this figure representing the sucrose content of Syrup of Ferrous Iodide

Merck's Lactose, Merck's C P dextrose, Merck's U S P citric acid, Merck's

U S P tartaric acid, Colgate's C P glycerin, U S P sucrose, U S P alcohol and U S P honey were tested in this manner Only 170 Gm /L of lactose were used due to its low solubility and honey was weighed as dextrose It was found that sucrose, dextrose, lactose, honey, and to a lesser degree, citric acid, exert a slow chemical action upon free iodine in the presence of iodide ion in aqueous solution

To determine the effect of ferrous ion upon this reaction, solutions were prepared containing approximately 0 236 mol/L of ferrous iodide, 2 484 mols/L of either honey, sucrose or dextrose and approximately 0 01 mol/L of free iodine They were stored either at 30° C or at 50° C and free iodine frequently determined The quantity of iodine reacting with the preservative is the difference between that originally present and the quantity present at the time of analysis plus free iodine formed at that temperature and viscosity by decomposition The latter values were obtained from the equation

$$K_m = 2\,303/t \log a/a - x$$

where x is the quantity of iodine formed in time t from a solution of original concentration a Values of K_m were obtained from Tables VI and VII by interpolation to the proper viscosities

It was found that heat accelerated the carbohydrate reaction to a greater degree than the auto-oxidation since samples at 50° C rapidly became free from iodine Samples at 30° C were decolorized slowly in the case of sucrose and more rapidly in the case of honey, although honey was more efficient in this respect at 30° C, sucrose was more rapid than honey at 50° C The action of dextrose was not so rapid, but at room temperature, about 22° C, none of these sugars reduced iodine as rapidly as it was formed Apparently, the ferrous ion present exerted a catalytic effect since reduction of iodine was more rapid than in simple aqueous solution The presence of some relatively rapid reducing agent in honey is indicated by the rate of reaction which is much greater than with sugars alone

TABLE VIII —THE EFFECT OF PRESERVATIVES UPON AQUEOUS SOLUTIONS OF FERROUS IODIDE AT 30° C STORED IN EXCESS AIR IN DARKNESS

Preservative	Hours	No of Det ns	$K_m \times 10^5$ Mean	S D $\times 10^5$	$K_m \times 10^5$	Rate of Decomp $\times 10^5$
Sucrose (Card teeth)	3003	6				0 85
Sucrose (Reag iron)	2824	5				0 85
Honey calc as dextrose	2520	4				1 56
Dextrose	2956	5	0 53	0 23	0 53 ± 0 10	1 05
Lactose 170 Gm /L	2525	4	1 77	0 61	1 77 ± 0 30	2 5
Glycerin	2478	4	1 25	0 64	1 25 ± 0 32	2 1
Citric acid	2775	5	1 75	0 36	1 75 ± 0 16	1 5
Tartaric acid	2394	5	2 71	0 95	2 71 ± 0 44	1 65
Alcohol	2374	4	1 95	0 43	1 95 ± 0 19	2 07

The Chemical Evaluation of Preservatives—To verify conclusions reached above, samples of aqueous solutions of ferrous iodide containing 2 484 mols/L of preservative were placed in the thermostat at 30° C in darkness with an excess of air in the container Iodine was determined at frequent intervals The data are summarized in Table VIII The quality of chemicals has been noted above Column 7 shows the rate of decomposition to be expected from viscosity readings performed upon these solutions These data are interpolated from Table VI

As indicated in Table VIII, true preservative effect beyond the effect of the viscosity imparted to the solution is shown by sucrose, honey, dextrose, lactose and glycerin Alcohol is apparently without effect and citric and tartaric acids increase the rate of decomposition This is probably due to the increased hydrogen-ion concentration of these acid solutions, the p_H was 0 4

The Pharmaceutical Evaluation of Preservatives —Solutions of ferrous iodide, approximately 5% except as noted, were prepared, except as noted, from card teeth and U S P iodine and contained the following honey, 500 cc /L , honey, 250 cc /L , sucrose, 425 Gm /L and honey, 425 cc /L , sucrose, 800 Gm /L and honey, 50 cc /L , 10% FeI_2 and 800 Gm /L of dextrose, sucrose, 850 Gm /L and H_3PO_2, 5 cc /L , sucrose, 850 Gm /L and $Na_2S_2O_3$, 1 Gm /L , 10% FeI_2 and sucrose, 850 Gm /L , sucrose, 850 Gm /L and NaOH, 0 1975, 0 2949 and 0 6908 Gm /L in separate samples, sucrose, 850 Gm /L , prepared with Reagent iron, sucrose, 850 Gm /L and hydroquinone, 5 Gm /L , glycerin, 800 cc /L , sucrose, 850 Gm /L and H_3PO_2, 5 cc /L (control), and sucrose, 850 Gm /L with H_3PO_2, 5 cc /L , prepared from Reagent iron Samples of these solutions were stored both in half-filled and in completely filled, tightly stoppered bottles in diffused light and in darkness at room temperature, in direct sunlight and in the refrigerator at about 6° C

At the end of 3 months, those samples stored in direct sunlight in the presence of air were black in color with the exception of those containing dextrose or glycerin, the dextrose sample alone contained free iodine Free iodine was contained in all samples stored in the refrigerator except those containing H_3PO_2 which had, however, darkened somewhat

In general, after 9 months' exposure, the following observations were made storage in completely filled bottles is desirable, sunlight hastens the appearance of black coloration although the increased temperature accelerates the reduction of iodine to a greater degree than the auto-oxidation of iodide, the addition of NaOH decreases the rate of iodine formation but is undesirable due to the coloration produced in the freshly made solution, Reagent iron samples show less free iodine than those prepared from card teeth, honey alone is valueless as a preservative, glycerin is ideal in sunlight but valueless in darkness or diffused light, $Na_2S_2O_3$ gives a cloudy preparation by liberation of free sulphur, hydroquinone is a valuable anti-oxidant except at low temperatures, and free iodine added to blackened preparations of ferrous iodide containing sucrose or honey, rapidly disappears

It was concluded that none of the combinations used was entirely satisfactory as offering a stable preparation

The Stabilization of Syrup of Ferrous Iodide —It has been shown that sucrose is incompatible with aqueous solutions of ferrous iodide It has likewise been shown that dextrose is compatible with both ferrous iodide and hypophosphorous acid Thus, it would appear that the ideal preparation would contain dextrose to give the properties of a syrup and hypophosphorous acid to prevent the liberation of iodine

Solutions of ferrous iodide containing the official quantity of H_3PO_2 and either 700 Gm /L of C P dextrose, commercial dextrose[1] or 400 Gm /L of U S P Glu-

[1] A brand of dextrose, ' Penford Crystal Sugar," made by Penick and Ford Cedar Rapids, Iowa was employed

cose were subjected to a temperature of 50° C for 3 months both in half-filled and in completely filled, tightly stoppered bottles A U S P control was run in conjunction The freshly prepared solutions varied in color with the purity of the dextrose used, C P dextrose gave a perfectly colorless preparation but that from U S P Glucose was definitely yellow

At the end of one month, the control was black but all other samples remained unchanged In 4 months, the syrups containing dextrose were pale yellow and contained a slight sediment, the change was more pronounced in samples stored in the presence of air and varied in direct proportion to the purity of the dextrose Samples containing Glucose, U S P X, had become very dark

One month's exposure in the oven at 50° C is roughly equivalent to 1 year under ordinary conditions, hence it may be assumed that dextrose samples would be acceptable for 4 years at ordinary temperatures

It was concluded that Syrup of Ferrous Iodide may be stabilized by substituting 700 Gm of dextrose for the sucrose contained in the official formula, either C P dextrose or the commercial grade being satisfactory The resulting preparation is very palatable The syrup so prepared is best kept at room temperature as some of the dextrose may crystallize at low temperatures

DISCUSSION OF RESULTS

It can be shown by solubility product data and p_H values that precipitation of ferric hydroxide cannot occur in Syrup of Ferrous Iodide On the other hand, similar calculations in conjunction with the quantity of air present, indicate that precipitation occurs in the reaction mixture of preparations at secondary equilibrium before dilution, but does not take place until after dilution in preparations from Reagent iron at primary equilibrium

It has been shown that no stoichiometric expression is applicable to the decomposition of aqueous ferrous iodide solutions On the other hand, hydrolysis has been shown to occur predominantly as

$$\text{(I)} \qquad FeI_2 + HOH \rightleftharpoons Fe(OH)I + HI$$

and therefore, the solution contains iodide and ferrous ions in the presence of hydrogen ions Iodide ion is oxidizable by oxygen according to the equation

$$\text{(II)} \qquad 2I^- + {}^1/_2O + 2H^+ \rightleftharpoons I_2 + HOH$$

Secondary hydrolysis of the basic ferrous iodide formed as shown in equation (I) furnishes small quantities of ferrous hydroxide

$$\text{(III)} \qquad Fe(OH)I + HOH \rightleftharpoons Fe(OH)_2 + HI$$

which may then be oxidized,

$$\text{(IV)} \qquad Fe(OH)_2 + {}^1/_2O_2 + HOH \rightleftharpoons Fe(OH)_3$$

This reaction may occur even in faintly acid media Thus the relative amounts of ferric hydroxide and iodine formed will depend entirely upon the relative ease of oxidation of ferrous hydroxide and iodide ion The normal oxidation potentials being

$$\begin{array}{lll} (Fe^{+++}, Fe^{++})Pt & = & 743 \\ ({}^1/_2I_2\ I^-\quad)Pt & = & 538 \\ (O_2\ OH^-\quad) & = & 396 \end{array}$$

As indicated in Table VIII, true preservative effect beyond the effect of the viscosity imparted to the solution is shown by sucrose, honey, dextrose, lactose and glycerin Alcohol is apparently without effect and citric and tartaric acids increase the rate of decomposition This is probably due to the increased hydrogen-ion concentration of these acid solutions, the p_H was 0 4

The Pharmaceutical Evaluation of Preservatives —Solutions of ferrous iodide, approximately 5% except as noted, were prepared, except as noted, from card teeth and U S P iodine and contained the following honey, 500 cc /L , honey, 250 cc /L , sucrose, 425 Gm /L and honey, 425 cc /L , sucrose, 800 Gm /L and honey, 50 cc /L , 10% FeI_2 and 800 Gm /L of dextrose, sucrose, 850 Gm /L and H_3PO_2, 5 cc /L , sucrose, 850 Gm /L and $Na_2S_2O_3$, 1 Gm /L , 10% FeI_2 and sucrose, 850 Gm /L , sucrose, 850 Gm /L and NaOH, 0 1975, 0 2949 and 0 6908 Gm /L in separate samples, sucrose, 850 Gm /L , prepared with Reagent iron, sucrose, 850 Gm /L and hydroquinone, 5 Gm /L , glycerin, 800 cc /L , sucrose, 850 Gm /L and H_3PO_2, 5 cc /L (control), and sucrose, 850 Gm /L with H_3PO_2, 5 cc /L , prepared from Reagent iron Samples of these solutions were stored both in half-filled and in completely filled, tightly stoppered bottles in diffused light and in darkness at room temperature, in direct sunlight and in the refrigerator at about 6° C

At the end of 3 months, those samples stored in direct sunlight in the presence of air were black in color with the exception of those containing dextrose or glycerin, the dextrose sample alone contained free iodine Free iodine was contained in all samples stored in the refrigerator except those containing H_3PO_2 which had, however, darkened somewhat

In general, after 9 months' exposure, the following observations were made storage in completely filled bottles is desirable, sunlight hastens the appearance of black coloration although the increased temperature accelerates the reduction of iodine to a greater degree than the auto-oxidation of iodide, the addition of NaOH decreases the rate of iodine formation but is undesirable due to the coloration produced in the freshly made solution, Reagent iron samples show less free iodine than those prepared from card teeth, honey alone is valueless as a preservative, glycerin is ideal in sunlight but valueless in darkness or diffused light, $Na_2S_2O_3$ gives a cloudy preparation by liberation of free sulphur, hydroquinone is a valuable anti-oxidant except at low temperatures, and free iodine added to blackened preparations of ferrous iodide containing sucrose or honey, rapidly disappears

It was concluded that none of the combinations used was entirely satisfactory as offering a stable preparation

The Stabilization of Syrup of Ferrous Iodide —It has been shown that sucrose is incompatible with aqueous solutions of ferrous iodide It has likewise been shown that dextrose is compatible with both ferrous iodide and hypophosphorous acid Thus, it would appear that the ideal preparation would contain dextrose to give the properties of a syrup and hypophosphorous acid to prevent the liberation of iodine

Solutions of ferrous iodide containing the official quantity of H_3PO_2 and either 700 Gm /L of C P dextrose, commercial dextrose[1] or 400 Gm /L of U S P Glu-

[1] A brand of dextrose, ' Penford Crystal Sugar," made by Penick and Ford, Cedar Rapids, Iowa was employed

cose were subjected to a temperature of 50° C for 3 months both in half-filled and in completely filled, tightly stoppered bottles A U S P control was run in conjunction The freshly prepared solutions varied in color with the purity of the dextrose used, C P dextrose gave a perfectly colorless preparation but that from U S P Glucose was definitely yellow

At the end of one month, the control was black but all other samples remained unchanged In 4 months, the syrups containing dextrose were pale yellow and contained a slight sediment, the change was more pronounced in samples stored in the presence of air and varied in direct proportion to the purity of the dextrose Samples containing Glucose, U S P X, had become very dark

One month's exposure in the oven at 50° C is roughly equivalent to 1 year under ordinary conditions, hence it may be assumed that dextrose samples would be acceptable for 4 years at ordinary temperatures

It was concluded that Syrup of Ferrous Iodide may be stabilized by substituting 700 Gm of dextrose for the sucrose contained in the official formula, either C P dextrose or the commercial grade being satisfactory The resulting preparation is very palatable The syrup so prepared is best kept at room temperature as some of the dextrose may crystallize at low temperatures

DISCUSSION OF RESULTS

It can be shown by solubility product data and p_H values that precipitation of ferric hydroxide cannot occur in Syrup of Ferrous Iodide On the other hand, similar calculations in conjunction with the quantity of air present, indicate that precipitation occurs in the reaction mixture of preparations at secondary equilibrium before dilution, but does not take place until after dilution in preparations from Reagent iron at primary equilibrium

It has been shown that no stoichiometric expression is applicable to the decomposition of aqueous ferrous iodide solutions On the other hand, hydrolysis has been shown to occur predominantly as

$$\text{(I)} \qquad FeI_2 + HOH \rightleftharpoons Fe(OH)I + HI$$

and therefore, the solution contains iodide and ferrous ions in the presence of hydrogen ions Iodide ion is oxidizable by oxygen according to the equation

$$\text{(II)} \qquad 2I^- + {}^1/_2O_2 + 2H^+ \rightleftharpoons I_2 + HOH$$

Secondary hydrolysis of the basic ferrous iodide formed as shown in equation (I) furnishes small quantities of ferrous hydroxide

$$\text{(III)} \qquad Fe(OH)I + HOH \rightleftharpoons Fe(OH)_2 + HI$$

which may then be oxidized,

$$\text{(IV)} \qquad Fe(OH)_2 + {}^1/_2O_2 + HOH \rightleftharpoons Fe(OH)_3$$

This reaction may occur even in faintly acid media Thus the relative amounts of ferric hydroxide and iodine formed will depend entirely upon the relative ease of oxidation of ferrous hydroxide and iodide ion The normal oxidation potentials being

$$\begin{array}{lll} (Fe^{+++}, Fe^{++})Pt & = & 743 \\ ({}^1/_2I_2\ I^- \quad)Pt & = & 538 \\ (O_2, OH^- \quad) & = & 306 \end{array}$$

it is evident that when both are present in the reduced form, ferrous iron will be oxidized more readily than iodide ion This is in accord with the experimental results

The oxidation of iodide ion in this preparation has been shown to be a first order reaction and dependent in rate upon the purity of the iron, the temperature, the action of light, access to air and viscosity or of some factor proportional to viscosity Its dependence also upon the hydrogen-ion concentration has been shown by Husa and Magid (18) Consequently, aside from slight increases in viscosity, changes in the ferrous iodide content of the preparation can have no effect upon the rate of iodine formation and increases in concentration of ferrous iodide will increase the quantity of iodine formed

It would appear, from data on preservatives, that levulose is a very efficient reducing agent for iodine in faintly acid media The action of honey is very rapid as regards the reduction of iodine, dextrose is much slower than sucrose and free iodine added to blackened ferrous iodide syrups is rapidly reduced, all these factors point to the action of levulose in this respect Thus it appears highly probable that the true decomposition of Syrup of Ferrous Iodide is the darkening caused by the oxidation of levulose by iodine or oxygen Darkening due to free iodine is not a factor in this decomposition since the appearance of free iodine is effectively prevented by hypophosphorous acid

The reducing action of glycerin in sunlight may be due to the formation of glyceric aldehyde which in turn is oxidized This aldehyde is formed only in light (19)

Obviously, Syrup of Ferrous Iodide may be stabilized by omitting sucrose from the formula Dextrose serves to give the characteristic properties of a syrup to the preparation and by its use the darkening is avoided

SUMMARY

A study has been made of the preparation, deterioration and stabilization of Syrup of Ferrous Iodide Impurities present in card teeth were found to cause variations in the progress of the reaction

Equations previously advanced to represent the decomposition of ferrous iodide preparations are shown to be unsatisfactory The present study indicates that the deterioration involves several different changes which occur simultaneously, but at different rates according to the conditions

The darkening of Syrup of Ferrous Iodide, U S P X, has been shown to be due chiefly to decomposition of levulose formed by hydrolysis of sucrose This darkening can be avoided by using dextrose in place of sucrose

The most practical means for the preservation of Syrup of Ferrous Iodide is the use of hypophosphorous acid to prevent the liberation of free iodine and the addition of dextrose rather than sucrose to give the properties of a syrup The use of 700 Gm /L of either C P or commercial dextrose yields a satisfactory product

BIBLIOGRAPHY

(1) Courtois, *Ann chim phys* [1], 88 (1813) 308
(2) E Durand, *Am J Pharm*, 4 (1833), 287
(3) Caillot *Ann chim phys* [2], 22 (1823), 136

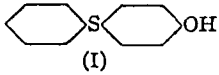
(4) Pierquin, *Repert pharm*, 38 (1831), 451
(5) H A Langenhan and C J Bradford, Jour A Ph A, 16 (1927), 561, 656
(6) George Lunge and C A Keane, "Technical Methods of Chemical Analysis," Gurney and Jackson, London (1911), Vol II, Part 1, page 81
(7) W C Alpers, Jour A Ph A, 3 (1914), 420
(8) Henry George Denham, *J Chem Soc*, 93 (1908), 41
(9) Theodore Salzer, *Pharm Ztg* 37 (1892), 224
(10) Samuel P Sadtler, Virgil Coblentz and Jeannot Hostmann, "Pharmaceutical and Medical Chemistry," J B Lippincott, Philadelphia and London (1927), 6th Edition, page 391
(11) E Mylius, *Pharm Zentralh*, 22 (1881), 137
(12) Arthur Owen Bentley and Driver, 'Textbook of Pharmaceutical Chemistry," Baillière, Tindall and Cox, London (1925), page 130
(13) Richard Phillips, Jr, *Pharm J* [1], 4 (1845), 19
(14) Frederick H Getman and Farrington Daniels, "Outlines of Theoretical Chemistry," John Wiley and Sons, 1931, 5th Edition, pages 321–357
(15) *Ibid*, page 58
(16) Berthoud and Nicolet *Helv Chim Acta* 10 (1927), 475, *J chim phys*, 25 (1928), 163, cited by N R Dhar 'The Action of Light," Blackie & Co, London and Glasgow (1931), page 169
(17) John C Krantz Jr Jour A Ph A 12 (1923), 964
(18) William J Husa and Louis Magid *Ibid*, 22 (1933), 279
(19) Henry Bierri, Victor Henri and Albert Ranc, *Compt rend*, 151 (1910), 318

School of Pharmacy,
University of Florida,
Gainesville, Fla

THE PREPARATION AND BACTERIOLOGICAL STUDY OF CERTAIN THIAZOLE AZO DYES *

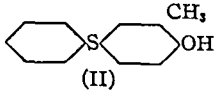
BY W A LOTT AND W G CHRISTIANSEN

In view of the recent demonstrations of the germicidal activity of divalent sulphur compounds such as *p*-hydroxy diphenyl sulphide, I,

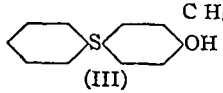


(I)

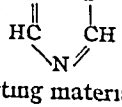
prepared by Hilbert and Johnson (1), and 3-methyl 4-hydroxy diphenyl sulphide, II, and 3-ethyl 4-hydroxy diphenyl sulphide, III,



(II)

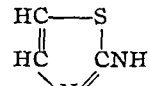


(III)

prepared by E Moness, W Braker and W G Christiansen (2), it seemed possible that divalent ring sulphur, as it appears in, for example, the thiazole heterocyclic ring  might also carry bactericidal activity The most readily available

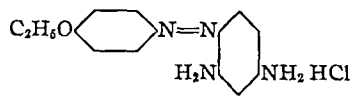
starting material of this type was the easily synthesized amino thiazole, IV,

* Scientific Section, A Ph A, Madison meeting 1933



(IV)

Inasmuch as some azo dyes such as 4-ethoxy 2′,4′-diamino azobenzene mono hydrochloride, V (Serenium), are bactericidal, it was thought that



(V)

compounds containing both the ring divalent sulphur and the azo groupings might be useful bactericides Some compounds of this type have been prepared by diazotizing amino thiazole and coupling with phenolic substances

PREPARATION OF AMINO THIAZOLE

The amino thiazole was prepared by the method of V Trauman (3) in which 53 Gm of thiourea in 250 cc water was condensed with 100 Gm α,β-dichlorethyl ether After the two liquid layers merged, refluxing was continued 10 minutes, after which the reaction mixture was evaporated until the characteristic odor of the α,β-dichlorethyl ether had disappeared After making the solution strongly alkaline it was extracted repeatedly with ether

The combined residue from these ether extracts was recrystallized out of alcohol, and a yield of 30 Gm of red crystalline amino thiazole of melting point 88 5° to 90 5° C was obtained

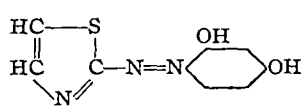
Analysis Found—S, 31 94% Calculated for $C_3H_4N_2S$ S, 32 00%

PREPARATION OF THIAZOLE AZO RESORCINOL

The diazotization of amino thiazole was very slow and incomplete by the usual method, but when all of the sodium nitrite is added at one time to the acidified solution of the amino thiazole, thereby obtaining a high concentration of nitrous acid, an acceptable yield of the diazonium salt is obtained

5 Gm of amino thiazole (0 5 mol) was dissolved in 13 cc of hydrochloric acid (1 5 mol) and 125 cc water This was diazotized at 0–5° C by adding 3 5 Gm of $NaNO_2$ as fast as possible without allowing the temperature to rise above 5° C , using efficient agitation and an external cooling bath of ice and salt There upon, 5 5 Gm resorcinol in 10 cc of cold water was added The precipitated azo dye was agitated without cooling for an hour in order to induce its change from a gelatinous material to a granular one

4 5 Gm of crude material having a low sulphur content was obtained Repeated reprecipitation out of alkaline solution by dilute HCl gave about 1 5 Gm of material which was shown by analysis to be thiazole azo resorcinol, VI,



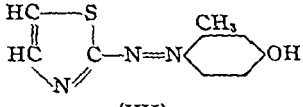
(VI)

Analysis Found—S, 14 99% Calculated for $C_9H_7ON_3S$ S, 14 47%

Bacteriological test showed that although this substance (when dissolved in aqueous alkali) had no germicidal activity, it inhibited growth of both Typhoid and Staphylococcus at a dilution of 1 to 8000

PREPARATION OF THIAZOLE AZO-*m*-CRESOL

5 Gm of amino thiazole was dissolved in 100 cc 20% H_2SO_4 and diazotized at 0–5° C with 3 5 Gm $NaNO_2$, the latter being added as in the above preparation When the excess of HNO_2 was very low, as indicated by starch iodide papers, 5 4 Gm meta-cresol in 10 cc water at 0° C and enough 10% NaOH to keep it in solution were added After agitating two hours at room temperature, the precipitated dye became granular This was filtered and reprecipitated several times out of alkaline solution by dilute HCl A yield of 5 8 Gm of thiazole azo *m* cresol, VII, was obtained

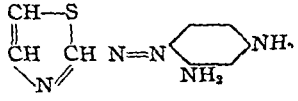


(VII)

Analysis Found—S, 13 33% Calculated for $C_{10}H_7ON_3S$ S, 14 60%

Although this material showed no germicidal action it inhibited the growth of Typhoid and Staphylococcus at dilutions up to 1 to 16,000 The dye was dissolved in water with a minimum quantity of sodium hydroxide for germicidal test

By coupling diazotized amino thiazole with metaphenylene diamine a dye was obtained which probably had the following structure



This product was not obtained in a sufficiently pure form to warrant biological tests

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E R Squibb & Sons and we gratefully acknowledge their assistance

SUMMARY

Thiazole azo resorcinol and thiazole azo *m*-cresol were prepared by the diazotization of amino thiazole with subsequent coupling of the diazonium salt with the respective phenols Although solutions of these two azo dyes failed to kill, they restrained the growth of Typhoid and Staphylococcus in dilutions of 1 to 8000 and 1 to 16,000, respectively

REFERENCES

(1) *J A C S*, 51 (1929) 1526
(2) Jour A Ph A, 21 (1932), 557
(3) V Trauman, *Berichte*, 21 (1888), 938

Research Department of the Chemical and Pharmaceutical Laboratories,
E R Squibb and Sons, Brooklyn, N Y

A STUDY OF THE ACRYLIC AMIDES AND UREIDES AS HYPNOTICS*

BY W A LOTT AND W G CHRISTIANSEN

It has long been known that the amides and ureides of acids of fairly high molecular weight are more or less hypnotic The variation in the hypnotic potency is very great and, in the unhalogenated acids, this potency seems to depend upon (1) the molecular weight, (2) the degree of branching of chain (ramification) and (3) the presence or absence of unsaturation

For those acids which can be viewed as derivatives of acetic acid, the correlation between the above factors and the potency has been rather well worked out For the derivatives of acrylic acid, $CH_2 = CH - COOH$, this correlation has, however, not previously been worked out It will be seen that acrylic acid and its derivatives are not derivatives of acetic acid, since there cannot be three separate substituents attached to the alpha carbon

It was the purpose of the work reported in this paper to evaluate as hypnotics the amides and the ureides of several major types of substituted acrylic acids, and in so far as it is possible over the limited field covered, to set up correlations between physiological activity and molecular weight, type of substituents and configuration

The acids from which these compounds are derived fall into three major classes from the standpoint of structure, *viz*

(1) Aliphatic substituted acrylic acids
(2) Substituted cinnamic acids
(3) Furane substituted acrylic acid

No new synthetic methods have been devised

ACIDS

The acids have been prepared by one of five well-known methods

(A) Oxidation of corresponding aldehyde (1)–(2) by means of silver oxide

(*a*) α-Ethyl-β-propyl acrylic acid
(*b*) α-Amyl cinnamic acid

(B) Condensation of an aldehyde with malonic acid in presence of pyridine (3)

(*a*) Furfuracrylic acid
(*b*) β-Propyl acrylic acid
(*c*) β-Propenyl acrylic acid (sorbic acid)

(C) Perkin Synthesis Condensation of benzaldehyde with the sodium salt of an acid which has no substituents in the alpha position, in the presence of acetic anhydride (4)

(*a*) α-Propyl cinnamic acid

(D) Claisen Synthesis Condensation of benzaldehyde with an ester of an acid which has no substituents in the alpha position, by means of sodium

* Scientific Section, A PH A , Madison meeting, 1933

(*a*) α Methyl cinnamic acid
(*b*) α Ethyl cinnamic acid
(*c*) α-Isopropyl cinnamic acid
(*d*) α-Ethyl *p* methoxy cinnamic acid
(*e*) α Ethyl *o*-chlor cinnamic acid

(E) Reformatsky Synthesis Condensation of acetophenone (or a homologue) with bromacetic ester by means of zinc (6)

(*a*) β Methyl cinnamic acid

ACID CHLORIDES

The acid chlorides were all readily prepared by heating the acids with a 100% excess of thionyl chloride under a reflux condenser When the reaction was complete the excess thionyl chloride was removed in vacuum at room temperature In most cases the acid chloride was then distilled in vacuum This was not necessary but facilitated the purification of the end products

AMIDES

The amides were prepared by the dropwise addition of the acid chloride to a 28% aqueous solution of ammonia, with mechanical agitation and external cooling The crude amide separated, usually as a discolored solid mass The ring-substituted cinnamides tended toward greater discoloration It was found that recrystallization from anhydrous methyl alcohol was the best means of purification, being facilitated sometimes by treatment with decolorizing carbon Yields in most cases were not good Earlier in the work, dilute ethyl alcohol and sometimes 95% alcohol were used as the crystallizing solvent

The following amides were prepared

(1) Furfuracrylic amide, melting point—168–169° C
Previously recorded melting point—168–169° C

(2) α-Ethyl β propyl acrylic amide, melting point—66–67° C
% N—9 22, calculated for $C_6H_{11}ON$ 9 88

(3) α Methyl cinnamic amide, melting point—125 5–126° C
Previously recorded melting point—128° C
% N—8 96, calculated for $C_{10}H_{11}ON$, 8 70

(4) α-Ethyl cinnamic amide, melting point—135–137° C
Previously recorded melting point—128° C
% N—7 84, calculated for $C_{11}H_{13}ON$, 8 00

(5) α Isopropyl cinnamic amide high melting isomer This isomer was obtained by crystallization from dilute alcohol
Melting point—127–129° C
% N—7 98, calculated for $C_{12}H_{15}ON$ 7 40

(6) α-Isopropyl cinnamic amide, low melting isomer This isomer was obtained by repeated recrystallization from ethyl alcohol
Melting point—111–111 5° C
% N—7 48%, calculated for $C_{12}H_{15}ON$, 7 40

(7) α Amyl cinnamic amide high melting isomer This isomer was obtained by recrystallization, first from dilute alcohol, and finally out of hot water
Melting point—124–124 5° C
% N—5 88, calculated for $C_{14}H_{19}ON$ 6 45

(8) α Amyl cinnamic amide, low melting isomer This isomer was obtained by re crystallizing the high melting isomer several times from 95% alcohol
Melting point—117° C
% N—6 47, calculated for $C_{14}H_{19}ON$, 6 45

(9) α Ethyl *p* methoxy cinnamic amide
Melting point—170–170 5° C
% N—6 95, calculated for $C_{10}H_{13}O_2N$, 6 83

(10) α Ethyl *o*-chlor cinnamic amide
Melting point—93–94° C
% N—7 16, calculated for $C_{11}H_{12}ONCl$ 6 70
% Cl—16 50, calculated for $C_{11}H_{12}ONCl$, 16 95

(11) α Ethyl cinnamic N ethyl amide
Melting point—99 5–100° C
% N—6 81, calculated for $C_{13}H_{17}ON$ 6 88

(12) β Methyl cinnamic amide
Melting point—115–116° C
Previously recorded melting point—115–116° C
% N—9 27, calculated for $C_{10}H_{11}ON$, 8 70%

UREIDES

The ureides were in all cases prepared by triturating the acid chloride with three equivalents of dry urea in a mortar, then warming in an oven at 70° C for 3 hours Purification was effected by leaching with cold water in order to remove urea, then with dilute sodium bicarbonate solution in order to remove any free acid or unreacted acid chloride The ureide was recyrstallized repeatedly from dilute alcohol

The following ureides were prepared

(1) Furfuracrylic ureide
Melting point—204–206° C
% N—15 43, calculated for $C_8H_8O_2N_2$ 15 55

(2) *n* Propyl acrylic ureide
Melting point—181–183° C
% N—18 11, calculated for $C_7H_{12}ON_2$, 17 94

(3) β Propenyl acrylic ureide (sorbic ureide)
Melting point—226–228° C
% N—18 10%, calculated for $C_7H_{10}ON_2$, 18 19%

(4) α-Methyl cinnamic ureide
Melting point—160–162° C
% N—14 55, calculated for $C_{11}H_{12}ON_2$, 13 72

(5) α Ethyl cinnamic ureide
Melting point—189–190 5° C
% N—13 70, calculated for $C_{12}H_{14}O_2N_2$, 12 84

(6) α Propyl cinnamic ureide
Melting point—184–186 5° C
% N—12 41, calculated for $C_{13}H_{16}O_2N$ 12 07

(7) α-Isopropyl cinnamic ureide
Melting point—190–191° C
% N—12 55, calculated for $C_{13}H_{16}O_2N_2$, 12 07

(8) α-Amyl cinnamic ureide
Melting point—158–159° C
% N—11 13, calculated for $C_{15}H_{20}O_2N_2$, 10 77

BIOLOGICAL TESTS, ALBINO RATS

Minimum sleep inducing doses (M E D), and minimum lethal doses of the several amides were first determined on albino rats In the cases where the drugs are inactive in very high doses, no attempt was made to determine these values within narrow limits, whereas in the cases of those drugs which were fairly active sufficient data were obtained to gain closer estimates of the true M E D and M L D

Amides (albino rats)

Drug	M E D Mg /Kilo		M L D Mg /Kilo
α Ethyl β propyl acrylic amide	275		525
α Methyl cinnamic amide	ca 625		>1500
α Ethyl cinnamic amide	350		> 400
α-Isopropyl cinnamic amide (high melting)	750–1500	= or	>1500
α Isopropyl cinnamic amide (low melting)	ca 700	ca	1350
α-Amyl cinnamic amide (high melting)	>2000		>2000
α Amyl cinnamic amide (low melting)	>2000		>2000
β Methyl cinnamic amide	300		> 900
α Ethyl *o* chlor cinnamic amide	500–800		1000–1200
α Ethyl *p* methoxy cinnamic amide	>3000		>3000
α Ethyl cinnamic N ethyl amide	ca 1750		1750
Furfuracrylic amide	100		< 100
α Bromo diethyl acetic ureide (Adalin)	350		525
Allyl isopropyl acetic ureide (Sedormide)	350		> 400

Ureides (albino rats)

Drug	M E D Mg /Kilo		M L D Mg /Kilo
β Propenyl acrylic ureide (sorbic)	>2000		>2000
β Propyl acrylic ureide	>2000		>2000
α Ethyl β propyl acrylic ureide	>2000		>2000
α Methyl cinnamic ureide	>2000		>2000
α Ethyl cinnamic ureide	>2000		>2000
α Propyl cinnamic ureide	>2000		>2000
α Isopropyl cinnamic ureide	>2000		>2000
α Amyl cinnamic ureide	>2000		>2000
Furfuracrylic ureide	ca 500–600	ca	500–600
α Bromodiethyl acetic ureide (Adalin)	350		350
Allyl isopropyl acetic ureide (Sedormide)	350		400

AMIDES AND UREIDES (DOGS)

In the cases of those drugs which were active against rats, further tests were

Drug	M E D Mg /Kilo	M L D Mg /Kilo
α Bromodiethyl acetic ureide (Adalin)	ca 75	
Allyl isopropyl acetic ureide (Sedormide)	ca 40	
α Ethyl cinnamic amide	>250	>250
α Ethyl *o*-chlor cinnamic amide	>450	
β Methyl cinnamic amide	>150	
α Ethyl β propyl acrylic amide	Due to vomiting of all higher doses, results were vitiated	
Furfuracrylic amide	ca 25	25 (after 48 hours)

carried out with dogs Wherever there was no hypnotic activity at 250 mg /Kilo no attempts were made to obtain a narrower evaluation except in one instance

All dogs died after three days Autopsy showed hemorrhagic condition of intestines and moderate congestion of stomach

Furfuracrylic ureide	>175	<75

Autopsy showed hemorrhagic condition of intestines and congestion of lungs

NOTE Retest of both furfuracrylic derivatives on rats were carried out Rats were in good condition after five days Autopsies disclosed no intestinal irritation or congestion

DISCUSSION OF BIOLOGICAL RESULTS

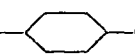
It is to be seen from the biological tests of the amides with rats that (1) the entirely aliphatic α-ethyl-β-propyl acrylic amide is the most active, (2) that in the alpha-alkyl cinnamic amides the activity reaches its peak in the α-ethyl cinnamic amide, and (3) that the β-methyl cinnamic amide is much more active than the α-methyl cinnamic amide Increasing the molecular weight above that of α ethyl cinnamic amide seems *per se* to decrease the potency When this increase of M W is due to substituents in which there is inherent tendency toward hypnotic action there is some compensatory action and the decline in potency is less drastic, *i e*, α-isopropyl cinnamic amide, and α-ethyl *o*-chlor cinnamic amide When the increase in molecular weight is through non-hypnotic substituents as in α ethyl *p*-methoxy cinnamic amide, or is above a certain limit as in α-amyl cinnamic amide this compensatory action is lacking and the hypnotic action is practically obliterated

The furane ring seems to be very toxic and since there is no sleep produced below the lethal doses with any of its derivatives, it seems to carry no characteristic hypnotic activity This has also been shown in the case of furoic amide (unreported)

It is to be seen from the biological tests of the ureides with rats that in no case has any characteristic hypnotic action been demonstrated In the case of the furfuracrylic ureide the sleep produced cannot be ascribed to any characteristic hypnotic action of the drug since it occurred only at lethal doses

The interpretation of these results is difficult since the resorption and fate of the molecules in the organism have not been studied Some assumptions are, however, suggested It seems, for instance, that the ureides are hydrolyzed completely in the intestines of the rat, whereas probably the amides are hydrolyzed much less rapidly The precipitate drop in activity when the molecular weight is increased beyond that of α-ethyl cinnamic amide and α-isopropyl cinnamic amide suggests that resorption fails due to low solubility

In the tests with dogs there seems to be evidence that the amides are much more rapidly hydrolyzed in the intestine of the dog than in the intestine of the rat Other instances of the more rapid destruction of amides and ureides in the higher animals are recorded in the literature

Structurally, the grouping  seems to contribute little hypnotic activity and deprives the molecule too greatly of its water solubility

The results with α-ethyl cinnamic N-ethyl amide support the belief that low resorbability is an important factor throughout the series In this compound it would be expected that both the hypnotic potency and the toxicity should be increased and that the therapeutic ratio potency/toxicity should be decreased The facts are (1) that the therapeutic ratio decreased greatly so that the hypnotic dose equalled the lethal dose, and (2) that the absolute values of both the potency and toxicity decreased These facts seem explainable only if it be assumed that only a small part of the dose was resorbed

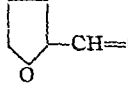
The biological tests on compounds reported herein were made in the Biological Research Laboratories of E R Squibb and Sons and we gratefully acknowledge their assistance

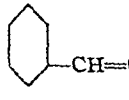
SUMMARY

1 An extensive series of ureides and amides derived from the substituted acrylic acids were prepared A large number of these acids were substituted β-phenyl acrylic or cinnamic acids One example of a β-heterocyclic acrylic acid, *viz*, furfuracrylic acid, was included

2 The biological results with rats seem to indicate that the whole series of compounds were characterized by low resorbability and that the ureide series were further characterized by rapid intestinal hydrolysis This rapid intestinal hydrolysis seems to be shared by the amide series in the intestine of higher animals (dog) The net hypnotic action and toxicities were, therefore, quite low

3 The furane ring is considerably more toxic than the benzene ring, and contributes no characteristic hypnotic action, so that in practical terms—


—CH=CH—CONH$_2$ is non hypnotic and toxic, whereas—


—CH=CH—CONH$_2$ is hypnotic and non-toxic

REFERENCES

(1) Delepin and Bonnet, *Compt rend*, 149 (1909), 39
(2) Bogert and Davidson, *J A C S*, 53 (1931), 3122
(3) "Organic Syntheses," Vol 9, page 38 J Wiley, New York
(4) Nieuwland and Daly, *J A C S*, 53 (1931), 1842

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES, E R SQUIBB AND SONS, BROOKLYN, N Y

THE WATER OF CRYSTALLIZATION OF QUININE SULPHATE *

BY H WALES [1]

Quinine sulphate crystallized from water has been variously reported as containing 7 and 8 molecules of water It has also been reported that when exposed

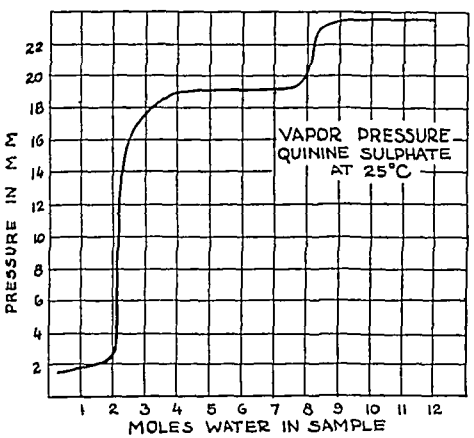
* Scientific Section A PH A, Washington meeting, 1934

[1] Drug Control Food and Drug Administration

to the air it loses water until the dihydrate is formed (Hesse, *Annalen*, 166 (1873), 217, 176 (1875), 213, Beal and Szalkowski, JOUR A PH A, 22 (1933), 1219) In all of the experiments reported, the water content has been determined by drying the quinine sulphate in an oven to constant weight Such tests while showing the amount of water which the quinine sulphate contains do not show how much, if any, exists as water of crystallization, and how much is simply ab sorbed or dissolved in the quinine sulphate

It is well known that any water-soluble substance when exposed to the air takes up or loses water until the vapor pressure of the solid solution is equivalent to the pressure of the water vapor in the atmosphere One method of determining the manner in which the water in a product is held is to measure the change in vapor pressure as small increments of water are removed at a constant tempera ture

Theoretically, if water is progressively removed from a hydrate the vapor pressure at a constant temperature remains constant as long as any of that hydrate remains At this point the pressure drops to that of a lower hydrate, if one is present, or to that of the anhydrous substance In practice, however, these breaks are not always sharp Beutell and Blaschke (*Centr Mineral Geol*, 1915, 199) found that in all cases where there is more than one hydrate, the dehydration on the surface of the particles proceeds further than in the interior "where cohesion hinders the evolution of water vapor" The inside of the particles, therefore, may consist of hydrates higher than those at the surface This prevents a sharp transition from one hydrate to the next and causes the break to become rounded in the plotted curve This rounding becomes more pronounced the greater the pressure difference between two hydrates



On the other hand when dealing with a compound in which the water is not present as a hydrate the pressure drops as the water is removed The curve showing the relation of vapor pressure to water content will not have the breaks characteristic of the hydrate curves, but will be perfectly smooth, its slope being determined by the tenacity with which the water is held

METHOD

Quinine sulphate was recrystallized from water and a weighed quantity of the wet crystals used for the determination Wet quinine sulphate was used in order to avoid any partial desicca tion of the highest hydrate The apparatus used was that described by Wales and Nelson (*J Am Chem Soc*, 45 (1923), 1657) The product to be tested was placed in a glass bulb sealed to a manometer A tube containing phosphoric anhydride was placed between this apparatus and the vacuum pump The system was evacuated for a few seconds the stop-cock between the drying tube and the manometer system closed and the pressure permitted to come to equilibrium before readings were taken By this method the vapor pressure was determined to ± 0.5 mm By weigh- ing the phosphoric anhydride tube after each evacuation the amount of water removed was deter

mined The total quantity of water in the quinine sulphate was determined from the total gain in weight of the tube containing phosphoric anhydride In order to insure complete dehydration the last traces of water were removed by long evacuation at 100° C

The accompanying table and chart show the results obtained at 25° C using this method The highest portion of the curve is approximately the vapor pressure of water at 25° C and represents the excess moisture since a wet sample was used The breaks in the curve correspond to 8 and 2 moles of water showing the existence of an octohydrate having a vapor pressure of 19 3 mm at 25° C and a dihydrate having a vapor pressure of approximately 2 mm at the same temperature No evidence of a heptahydrate is shown Due to the fact that the apparatus used was not capable of determining pressures below 2 mm with any degree of accuracy the possibility of a third hydrate having less than two molecules of water of crystallization has not been precluded

VAPOR PRESSURE AT 25° C OF QUININE SULPHATE CONTAINING VARYING AMOUNTS OF WATER

Water in Sample Per Cent	Moles Water in Sample	Pressure Mm	Water in Sample Per Cent	Moles Water in Sample	Pressure Mm
19 36	10 31	23 5	9 78	4 49	19 0
19 18	9 83	23 5	8 02	3 93	19 0
18 36	9 32	23 2	7 69	3 45	18 4
17 71	8 92	23 0	7 13	3 18	18 0
16 86	8 40	23 0	6 49	2 88	17 0
16 22	8 02	20 0	5 87	2 58	16 5
15 33	7 50	19 8	5 25	2 29	14 0
13 85	7 00	19 3	4 92	2 15	8 5
13 66	6 56	19 3	4 84	2 11	4 6
13 02	6 20	19 5	4 78	2 08	2 2
12 25	5 79	19 2	2 51	1 10	1 8
11 56	5 42	19 1	1 02	0 43	1 6
10 74	4 98	19 0			

As stated above, quinine sulphate when exposed to the air takes up or loses water until its vapor pressure is in equilibrium with the vapor pressure (humidity) of the air in the room Since the octohydrate has a vapor pressure close to that of water (corresponding to a humidity of about 82% at 25° C) it will lose water unless exposed to very moist air The dihydrate on the other hand would be in equilibrium with the air only under desert conditions Inspection of the accompanying curve shows that under ordinary conditions equilibrium with water vapor in the air will be reached somewhere on the sharp break in the curve and that quinine sulphate stored in an open container will contain slightly more than 2 moles of water

CONCLUSIONS

By means of vapor pressure measurements it is shown that the water content of quinine sulphate is present as water of crystallization Quinine sulphate crystallizes from water at room temperature with eight molecules of water of crystallization This is not stable when exposed to the air and is transformed to the dihydrate No evidence of quinine sulphate containing seven molecules of water of crystallization was found

THE LEAVES OF PENTSTEMON COBÆA, NUTT *[1]

BY LOYD E HARRIS AND RUTH ANN CONNER [2]

Pentstemon cobæa, Nutt , of the Scrophulariaceæ family, is commonly called Beard-tongue (1), Cobacea (2) and Balmona (3) Nuttall discovered it in Arkansas in 1833 and named it cobæa in "Collection towards a Flora of the Territory of Arkansas" (4) in 1834 It is still widely distributed in calcareous soil from Missouri to Central Texas, where in the malarial districts its use for prevention of "the chills" is still practiced according to Indian custom It is said to have been used in the Chickasaw nation as a cathartic Some use the entire plant but the majority of the laity make a "tea" from either the freshly gathered or the dried leaves and take it in one teaspoonful doses as a tonic

Fig 1 —Pentstemon Cobæa (Picture taken northeast of Norman, Okla 1932)

EXPERIMENTAL

The leaves were collected June 20, 1931, soon after flowering had ceased Only leaves of the flowering stem were gathered as the basal leaves live all winter A sample collected in 1932 was used in a comparison of moisture determinations (5)

	Wt of Sample	Gm Lost	Per Cent Moisture
1931	10 0038	0 9323	9 52
	10 0025	0 9590	9 58
1932	5 0	0 5055	10 11
	5 0	0 5044	10 08

Ash determinations according to the method of the Association of Official Agricultural Chemists gave the following results

Wt of Sample	Total Ash	Water Sol Ash	Insol Ash
2 0 Gm	8 36 per cent	2 75 per cent	5 61 per cent
2 0 Gm	8 16 per cent	2 76 per cent	5 39 per cent

Extraction with selective solvents was carried out according to the method of Dragendorff (6), using some modifications, with the following results

* Scientific Section A PH A , Madison meeting 1933

[1] An abstract of a thesis submitted to the Graduate School, The University of Oklahoma in partial fulfilment of the requirements for the degree of Master of Science in Pharmacy

[2] Graduate assistant in Pharmacy

Solvent	Sample No 1 10 6594 Gm	Sample No 2 11 6613 Gm	Per Cent Sample No 1	Per Cent Sample No 2
Pet ether	0 0445	0 0490	0 41	0 42
Ether	0 1445	0 1514	1 35	1 29
Alcohol	1 7427	1 9054	16 34	16 34
Water	2 0050	2 1970	18 81	18 97
Dil alkali (2 per cent)	2 3710	2 5890	22 25	22 21
Dil acid (1 per cent)	1 3222	1 4824	12 42	12 37
Crude fibre	1 7830	1 9292	16 61	16 55
Moisture	(Previously determined)		9 55	9 55
Total	9 5445	10 5051	97 54	97 50

ALCOHOLIC EXTRACT

During the preliminary extraction, crystals were noticed in the alcoholic extract, as the alcohol was allowed to evaporate spontaneously In order to get enough of this material for study two large samples, or a total of one thousand one hundred fifteen and one-tenth grams of the ground leaves were exhausted with petroleum ether, then extracted with dehydrated alcohol The results were

Weight of sample	490 1 Gm	625 0 Gm
Total residue	78 8815 Gm	101 08 Gm
Per cent extracted	16 09 Gm	16 17 Gm
Impure crystals separated	3 0 Gm	15 2 Gm

The impure crystals were separated and washed with warm dehydrated alcohol The use of a suction filter was found necessary The washing was continued until no more green color was removed After taking up in hot dehydrated alcohol the solvent was allowed to evaporate spontaneously The crystals appeared cream colored and had a characteristic, although faint, sweet taste

Solubility of the Crystals

Readily soluble in warm	Glycerine Water
Slightly soluble in hot	Methyl Alcohol Benzene
Fairly soluble in hot	Amyl Alcohol Acetone Ethyl Acetate
Readily soluble in boiling	Ethyl Alcohol Isopropyl Alcohol
Insoluble	Acetic Acid

The melting point of the crystals was 163° C (unc) After repeated recrystallization the melting point was unaltered, however after boiling with water a substance was separated giving a different melting point (70–72° C) Crystals from the filtrate continued to meet at 163° C

An aqueous solution (1–20, W/V) had no effect on polarized light

The crystals did not reduce Fehling's solution and the results were still negative after attempts to hydrolyze them with diluted hydrochloric acid in a sealed glass tube Qualitative analysis showed the absence of sulphur, nitrogen, chlorine, bromine and iodine

PHARMACEUTICAL PREPARATIONS

Since *Penstemon cobæa* is administered medicinally in the form of a "tea" it was decided to prepare pharmaceutical preparations that would represent the constituents expected to be found in the tea

A decoction prepared according to the U S P directions and then evaporated to dryness gave the following results

	Wt. of Powdered Leaves	Wt of Residue	Per Cent of Water Soluble Extractives
Sample No 1	5 0 Gm	1 9325 Gm	38 65
Sample No 2	5 0 Gm	1 9403 Gm	38 80

An infusion was also prepared according to the general formula of the U S P and the total water-soluble contents determined The results were

	Wt of Powdered Leaves	Wt of Residue	Per Cent of Water Soluble Extractives
Sample No 1	5 0 Gm	1 8794 Gm	37 58
Sample No 2	5 0 Gm	1 8809 Gm	37 61

REFERENCES

(1) *The Garden* (Dec 1878), *Meehan's Monthly*, Vol IV, page 114

(2) A preliminary list of the Fern and Seed Plants of Oklahoma "Jeffs and Little, Biological Survey," Vol II, No 2, page 80

(3) So-called by people using the plant medicinally

(4) *Trans Amer Philo Soc*, New Ser V, 22 (1837), 182

(5) Oven method, U S P X

(6) Plant analysis by Dragendorff (trans by Greenish)

FROM THE LABORATORY OF THE SCHOOL OF PHARMACY
THE UNIVERSITY OF OKLAHOMA, NORMAN, OKLAHOMA

NATHANIEL LORD BRITTON

In the following sketch, Dr H H Rusby's tribute to Nathaniel Lord Britton in *Science*, August 3rd, is quoted, in part

"This learned and productive scientist, whose death occurred on June 25th in his seventy-fifth year, was in all respects a son of the state and city in which he lived and died Born and bred in Staten Island, of local ancestry, his early life and interests, which even in childhood were directed toward nature loving and studying, were closely bound up with the life of that island and have left their eternal imprint on the scientific and educational character of its community

"While the scientific world will be content to read and refer to his published works we, who knew him more intimately, may do well to look behind the work and consider the conditions under which it was performed and the manner of its doing and form an estimate of the character and life of the man

"Professionally educated at Columbia he became connected with it as instructor immediately upon his graduation and the educational relationship thus established continued throughout life Into the affiliation of Columbia's faculty with the scientific activities of the city Dr Britton entered most heartily and soon he became recognized as one of the dependable supporters of the work of several of these societies He became active in the proceedings of both the Linnæan and Microscopical societies, but his special interest was in the academy and the Torrey Botanical Club, the successful development of both of which has been largely due to his service and influence at the same time that he was equally active in the work of the now flourishing Natural History Association of Staten Island His later connection with the Botanical Garden, a city institution, brought him into close relations with the city government, so that he became associated with many of those who have conducted its political and financial affairs for a third of a century Thus, while the many interests in this and foreign countries which have profited by his labors will feel his loss as a scientist, our city will also miss him as an active and distinguished citizen"

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

PHARMACOPŒIAS AND FORMULARIES

Casparis, P
Review of the Swiss Pharmacopœia V
Schweiz Apoth -Ztg , 72 (1934), 313

APPARATUS AND MANIPULATIONS

Cooper, William
Autoclaving of solutions in plugged vessels
Pharm J , 133 (1934), 29
Gill, Paul H , and Augustus H
Mackey oil tester
Ind Eng Chem , Analyt Edit 6 (1934) 271

PHARMACEUTICAL PREPARATIONS

Arny, H V , *et al*
Deterioration of certain medicaments under the influence of light
JOUR A PH A , 23 (1934), 672
Brandrup, W
Use of pectin as an agent for emulsifying cod liver oil
Pharm Zentralh , 75 (1934), 421
Brindle, H , and Burlinson H
Preparation, viscosity and suspending power of mucilage of tragacanth
Quart J Pharm & Pharmacol , 7 (1934), 162
Burlinson, H
Preservation of mucilage of tragacanth
Quart J Pharm & Pharmacol , 7 (1934), 159
Christensen, E V , and Stroyberg, Jens
Investigation of the solution of aluminum subacetate
Arch Pharm og Chem , 41 (1934), 437, 461
Davis, H
Preparation of sterile solutions
Quart J Pharm & Pharmacol , 7 (1934), 49
Delsart L
Solutions of mercurials for injection
Bull sci pharmacol , 41 (1934), 344
Fantus, B , *et al*
Vehicles for medicines
JOUR A PH A , 23 (1934), 698
Girault F
Tincture of aconite
J pharm chim , 19 (1934), 5
Haddock, L A
Viscosity of tragacanth mucilages
Quart J Pharm & Pharmacol , 7 (1934), 175
Hill C A , and Powell, A D
Loss of phenol from phenol lozenges
Quart J Pharm & Pharmacol , 7 (1934), 205
Husa, William J , and Klotz, Lyell J
Stabilization of syrup of ferrous iodide
JOUR A PH A , 23 (1934), 679
Jackson, F J
Note on isotonic solutions
Chem & Drug , 120 (1934), 694
Kuhn, A
Contribution to the knowledge of homeopathic preparations II Anemonin-containing tinctures
Pharm Zentralh , 75 (1934) 405
Lupton, A W
Preparation of dry extract of Ipecacuanha
Quart J Pharm & Pharmacol , 7 (1934), 153
Morton, C and Bateson, F R C
Composition and stability of Donovan's solution
Quart J Pharm & Pharmacol , 7 (1934), 117
Regnier, J , and David, R
Effect of heating on anæsthetic power of solutions of cocaine hydrochloride
Bull sci pharmacol , 40 (1933), 650
Reinhard, Erich
Preparation of cod liver oil emulsion
Apoth -Ztg 49 (1934) 858
Schousen, Chr
Fluidextract of Condurango
Dansk Tids Farm , 8 (1934), 161
Schulze, Konrad
Solution of iron subacetate, "Ergänzungsbuch 5"
Apoth -Ztg , 49 (1934), 857
Toni, G
Preparation of tincture of strophanthus
J Soc Chem Ind , 53 (1934), 603B

Trotman, S R , and Ball, H S
Effect of salts on the setting of aqueous solutions of gelatin
J Soc Chem Ind , 53 (1934), 225T
Vergez G
Change in the stabilization of phenol water
Bull soc pharm Bordeaux, 71 (1933), 56
Wieder, H
Size of colloidal particles in homeopathic grinding
Arch Pharm 272 (1934), 198

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Baer, Harry Leonard
Dermatitis due to aniline dye in food
J A M A , 103 (1934), 10
Benjamin, Julein E , and Biederman, Joseph B
Effect of amidopyrine on agranulocytic leukopenia
J A M A , 103 (1934), 161
Bohn S S
Agranulocytic angina following ingestion of dinitrophenol
J A M A 103 (1934), 249
Duquenois P , and Revel, P
Intoxications due to esters used as solvents
J pharm chim 18 (1934), 590
Bliss, A R Jr *et al*
Absorption of calcium
JOUR A PH A , 23 (1934), 656
Easson A P T *et al*
Relation between chemical constitution and purgative action
Quart J Pharm & Pharmacol 7 (1934) 179
Gilmour J P
Discovery of chloroform as a general anæsthetic
Quart J Pharm & Pharmacol 7 (1934) 110
Haag, H B and Woodley, J D
Use of pigeons in estimation of digitalis potency
J Pharmacol & Exper Therap 51 (1934) 360
Huggett, A St George
Mechanism of the anti-coagulant action of azo-dyes in blood clotting
Quart J Pharm & Pharmacol , 7 (1934) 42
Johns, C K
Germicidal power of sodium hypochlorite
Ind Eng Chem , 26 (1934), 787
Lieb C C , and Mulinos, Michael G
Pigeon emesis and drug action
J Pharmacol & Exper Therap 51 (1934), 321
Matzger, Edward
Can sensitivity to dinitrophenol be determined by skin test?
J A M A 103 (1934) 253
Meek, Walter J , and Seevers, M H
Cardiac irregularities produced by ephedrine and a protective action of sodium barbital
J Pharmacol & Exper Therap , 51 (1934), 287
Paskind, H A
Absence of deteriorating effects of bromides in epilepsy
J A M A , 103 (1934), 100
Regnier, Jean and David, Robert
Maintenance of the physiological activity of cocaine hydrochloride solutions
Bull sci pharmacol , 41 (1934), 321
Rymill, F E , and Corran, R F
Further studies on mercurochrome
Quart J Pharm & Pharmacol , 7 (1934) 213
Sartory A *et al*
Contribution to the therapeutics of mycoses
Bull sci pharmacol , 41 (1934), 338
Saltzstein, Harry C
Injection of absolute alcohol for the control of pain in far advanced malignant growths
J A M A , 103 (1934), 242
Schwarz A John
Standardization of digitalis
Am J Pharm , 106 (1934), 196
Sidel Nathan
Jaundice caused by dinitrophenol poisoning
J A M A 103 (1934) 254
Walker Alfred A
Alum toxoid in diphtheria immunization
J A M A , 103 (1934) 227
Wokes F and Willimot S G
Cardiac activity and toxicity towards rats of red and white squills from Cyprus
Quart J Pharm & Pharmacol , 7 (1934) 235

BOTANY AND PHARMACOGNOSY

Cain, Russell A , and Lynn, E V
Two species of the genus ledum
JOUR A PH A , 23 (1934), 666
Coutts, J
Seasonal variation of santonin in Scottish Artemisias
Quart J Pharm & Pharmacol , 7 (1934) 62
Denolin Jean
Some commercial varieties of Smilax
J pharm Belg , 16 (1934) 555
Dewar T
Histology of leaves of Digitalis lanata Ehrh
Quart J Pharm & Pharmacol , 7 (1934) 1
Freise Fred W
Genuine and false Condurango bark
Pharm Zentralh 75 (1934) 423
Fujita, N and Okada S
Pharmacognostic study of Epimedium

J Pharm Soc Japan, No 627 (1934) 65

Gisvold, O
Digitonin and phytosterol from seeds of Digitalis purpurea
Jour A Ph A, 23 (1934), 664

Hifny, Saber A
Determination of senna stalk in senna
Quart J Pharm & Pharmacol, 7 (1934), 105

Maheu J, and Chartier, J
Pharmacography of digitalis
Bull sci pharmacol, 41 (1934), 347

Munesada, T, and Watanabe, C
Pharmacognostic investigation of the herb of some Epimedium species
J Pharm Soc Japan No 627 (1934), 71

Peyer, W
Pharmacognostic and chemical studies of the drugs of the "Erganzungsbuch V" in powdered form
Apoth Ztg, 49 (1934), 875 894 919

Rotermel, A
Mechanical extraction of opium
Pharm Ztg 79 (1934), 729

Wallis, T E, and Withell E R
Fluorescence and detection of rhapontic rhubarb
Quart J Pharm & Pharmacol, 7 (1934) 244

ALKALOIDS AND GLUCOSIDES

Canals, E, *et al*
Rotatory dispersion of the salts of quinine of the French Codex
J pharm chim, 18 (1934) 578

Chou, T Q, and Mei, P F
New alkaloid from Chinese ephedra
Pharm J, 133 (1934) 33

Dafert O
Contribution to the knowledge of saponins
Monatsbeilage Pharm Presse 5 (1934), 61

Dietzel, R, and Kühl G W
Decomposition of alkaloids in aqueous solution, especially during sterilization
Arch Pharm 272 (1934) 369

Kon G A R
Constitution of strophanthidin
J Soc Chem Ind 53 (1934) 593

Poe, Charles F and Suchy John F
Some strychnine benzoates
J Am Chem Soc 56 (1934) 1640

Travell Janet
Potassium mercuric iodide reagents for alkaloids
Jour A Ph A, 23 (1934), 689

ESSENTIAL OILS

Angla, B
Examination of Algerian geranium oil for esters
Parfumes de France, 11 (1933), 137

Louveau, G
Neroli oil
Rev Marques Parfum Savonn, 11 (1933), 245

Rovesti, G
Rosmarinus officinalis and its Italian essential oils
Riv ital Essenze Prof, 15 (1933), 227

Tabuteau, J
Terpenes of Java citronella oil
Bull l'inst pin (1933), 237

Zuidzee, N V H M Stille
Java citronella oil
Perf and Ess Oil Rec, 25 (1934), 184

OILS FATS AND WAXES

Better E I, and Szimkin, J
Color reactions of olive oil
Fettchem Umschau, 41 (1934) 72

Cocking, T Tusting and Crews, S K
Fluorescence test for olive oils
Quart J Pharm & Pharmacol, 7 (1934), 201

Denz, F A, and Shorland, F B
Composition and vitamin-A value of some New Zealand fish-liver oils
New Zealand J Sci Tech, 15 (1934), 327

Dyson, G Malcolm
Some perfumery products from cocoanut oil and castor oil
Perf and Ess Oil Rec, 25 (1934), 174

Evers, N and Smith W
Analytical classification of fish-liver oils, IV and V
Quart J Pharm & Pharmacol 7 (1934) 146

Flanders, Fred F, and Truitt Anna D
Determination of butter fat in presence of coconut oil
Ind Eng Chem, Analyt Edit 6 (1934), 286

Franck, H H
New synthetic methods in the manufacture of fatty materials
Chim et Ind, 31 (1934), 889

Hilditch, T P, and Stainsby, W J
Composition of some Malayan vegetable fats
J Soc Chem Ind 53 (1934), 197T

Hoyt L F
Bear grease
Oil and Soap, 11 (1934) 85

Kawai, K and Yoshida M
Vitamin D potency of Japanese cod liver oil
J Pharm Soc Japan No 627 (1934), 87

Schrader, Helmuth
Critical studies in the analysis of fatty oils with special reference to evaluation by viscosity determinations
Pharm Ztg, 79 (1934), 687, 699
Simmons, W H
Adulterated cananga oil
Perf and Ess Oil Rec, 25 (1934), 167
Vizern, M, and Guillot
Determination of paraffin wax in beeswax
Chim et Ind, 31 (1934), 932

ANALYTICAL METHODS AND RESULTS

Asahina, Y, and Nonomura, S
Preparation and properties of 2,4-dimethylresorcinol
J Pharm Soc Japan, No 627 (1934), 73
Beardsley, W J, and Styles, B J
Determination of mercury in hydrargyrum cum Creta
Quart J Pharm & Pharmacol, 7 (1934), 211
Beukema Goudsmit, Mme
Contribution to the quantitative iodometric and bromometric determination of phenol, salicylic acid and cresol
J pharm chim, 19 (1934), 19
Brindle, H
Assay of phenazone
Quart J Pharm & Pharmacol, 7 (1934), 123
Bümming, G, and Kroll S
Testing of calcium glycerophosphate
Arch Pharm, 272 (1934), 297
Ekkert, Lad
Contribution to the reactions of carbohydrates
Pharm Zentralh, 75 (1934), 407
Ekkert, Lad
Contribution to the reactions of ethylurethane
Pharm Zentralh, 75 (1934) 406
Ferrey, G J W
Determination of phosphorus in phosphate, hypophosphite and glycerophosphate syrups
Quart J Pharm & Pharmacol, 7 (1934), 16
Girault, Fernand
Estimation of lactic acid
Bull sci pharmacol, 41 (1934), 331
Glaister, John
Kastle-Meyer test
Practitioner, 793 (1934), 114
Hall G F, and Powell, A D
Analysis of acriflavine B P and neutral acriflavine
Quart J Pharm & Pharmacol, 7 (1934), 192
Hampshire C H, and Page, G R
Determination of camphor in galenicals by means of 2 4-dinitrophenylhydrazine
Quart J Pharm & Pharmacol, 7 (1934), 228
Hampshire, C H
Note on sulphuric acid test for liquid paraffin
Quart J Pharm & Pharmacol, 7 (1934), 24
Hartley, F, and Linnell, W H
Use of diphenylamine in assay of saccharated iron compounds
Quart J Pharm & Pharmacol, 7 (1934), 219
Heading, W R
New method of analysis of some mercurial ointments
Quart J Pharm & Pharmacol, 7 (1934), 76
Heading, W R
Improved method for assay of ointment of mercuric nitrate
Quart J Pharm & Pharmacol, 7 (1934), 83
Kahane, Ernest
Determination of sulphur and phosphorus in medicaments after oxidation with perchloric acid
J pharm chim, 19 (1934), 26
Neugebauer, H
Contribution to the identification of homeopathic potencies of Rubia Tinctoria and Nitras Uranicus
Pharm Weekbl, 71 (1934), 745
Page, G R
Notes on some pharmacopœial tests I Quinine ethyl carbonate, atropine sulphate, potash alum, alum, solution of cresol with soap
Quart J Pharm & Pharmacol, 7 (1934), 31
Reichert, Benno
Assay of Tartarus stibiatus according to the German Pharmacopœia VI
Pharm Zentralh, 75 (1934), 437
Steinhausen
Identification of homeopathic preparations
Apoth-Ztg, 49 (1934), 791
Schulek, E, and Floderer, S
Determination of mercury content of pharmaceutical mercury preparations
Z anal Chem, 96 (1934), 388
van Giffen, H J
Analytical notes from the Laboratory of the Netherlands Pharmaceutical Association
Pharm Weekbl, 71 (1934), 718
Wetherell, S
Assay of strong solution of lead subacetate
Quart J Pharm & Pharmacol, 7 (1934), 129

INORGANIC CHEMICALS

Carter, F E
Preparation of a stable form of ferrous chloride
Quart J Pharm & Pharmacol 7 (1934), 59

Lucas, V
Incompatibility of sodium bicarbonate and mercurous chloride
Bol assoc brasil pharm, 14 (1933), 301

ORGANIC CHEMICALS

Bird, F C J
Note of mercuric oxycyanide
Quart J Pharm & Pharmacol, 7 (1934), 251
Charpentier, Paul
Study of the system, butylethylmalonylurea (Soneryl) and dimethylaminophenol dimethylpyrazolon (pyramidon)
Bull sci pharmacol, 41 (1934), 328
Cox, Gerald, J, *et al*
Solubility of calcium levulinate in water
JOUR A PH A, 23 (1934), 662
Fieser, Louis F, and Bannerot, R A
Tautomerism of aminonaphthoquinones
J Am Chem Soc, 56 (1934), 1565
Hann, Raymond M
Second synthesis of glucosidoferulic acid
J Am Chem Soc, 56 (1934), 1631
Jurist, A E, and Christiansen, W G
Comparison of neoarsphenamine and sulpharsphenamine when they are dialyzed
JOUR A PH A, 23 (1934), 686
Katz, I
Seignette's salt of the Belgian Pharmacopœia IV
J pharm Belg, 16 (1934), 573
Marshall J
Note on preparation of pure acriflavine
Quart J Pharm & Pharmacol, 7 (1934), 184
Woodward, W A, and Pickles J
Stability of mixtures of hydrogen peroxide and ethyl alcohol
Quart J Pharm & Pharmacol, 7 (1934), 88

PHYTOCHEMICAL LITERATURE *

BY EDWARD KREMERS

Friedrich Rochleder was born May 15, 1819, in Vienna, the son of the apothecary Anton Rochleder He died Nov 5, 1874, as professor in the University of the capital of Austria

Not satisfied with the routine of the apothecary shop, he began the study of medicine in his native city, receiving the doctor's degree in 1842 While thus engaged he took a special liking to chemistry for which his pharmaceutical apprenticeship had prepared him in part Hence, after the completion of his medical studies he went first to Prag and then to Giessen His knowledge of vegetable drugs and of botany coupled with his chemical training under Liebig caused him to specialize in phytochemistry toward which most of his experimental and literary efforts were directed

Having spent several months in Paris and London, at the age of 26 he was appointed Professor of Technical Chemistry at the Academy at Lemberg In 1849 he succeeded his friend Redtenbacher at Prag, whom he again succeeded in Vienna in 1870

A fairly complete list of his publications may be found in Poggendorff's *Biographisch-literarisches Handwoerterbuch* It is noteworthy that, whereas the more general literary productions appeared between 1847 and 1858, his activities after the latter date were restricted to more specific investigations Optimistic as he was with regard to the fundamental importance of phytochemistry to plant physiology, he realized that only a mere beginning had been made and that much more detail work was necessary before worth-while generalizations could be indulged in with profit

His literary contributions in book form are

* Section on Historical Pharmacy, A PH. A, Toronto meeting, 1932 Continued from JOUR A PH A 21 365

Schrader, Helmuth
Critical studies in the analysis of fatty oils with special reference to evaluation by viscosity determinations
Pharm Ztg, 79 (1934), 687, 699
Simmons, W H
Adulterated cananga oil
Perf and Ess Oil Rec, 25 (1934), 167
Vizern, M, and Guillot
Determination of paraffin wax in beeswax
Chim et Ind, 31 (1934), 932

ANALYTICAL METHODS AND RESULTS

Asahina, Y, and Nonomura, S
Preparation and properties of 2,4-dimethylresorcinol
J Pharm Soc Japan, No 627 (1934) 73
Beardsley, W J, and Styles, B J
Determination of mercury in hydrargyrum cum Creta
Quart J Pharm & Pharmacol, 7 (1934), 211
Beukema Goudsmit, Mme
Contribution to the quantitative iodometric and bromometric determination of phenol, salicylic acid and cresol
J pharm chim, 19 (1934), 19
Brindle, H
Assay of phenazone
Quart J Pharm & Pharmacol, 7 (1934) 123
Bumming, G, and Kroll, S
Testing of calcium glycerophosphate
Arch Pharm, 272 (1934), 297
Ekkert, Lad
Contribution to the reactions of carbohydrates
Pharm Zentralh, 75 (1934), 407
Ekkert, Lad
Contribution to the reactions of ethylurethane
Pharm Zentralh, 75 (1934), 406
Ferrey G J W
Determination of phosphorus in phosphate, hypophosphite and glycerophosphate syrups
Quart J Pharm & Pharmacol, 7 (1934), 16
Girault, Fernand
Estimation of lactic acid
Bull sci pharmacol, 41 (1934), 331
Glaister, John
Kastle-Meyer test
Practitioner, 793 (1934), 114
Hall, G F, and Powell A D
Analysis of acriflavine B P and neutral acriflavine
Quart J Pharm & Pharmacol, 7 (1934) 192
Hampshire C H, and Page, G R
Determination of camphor in galenicals by means of 2 4-dinitrophenylhydrazine
Quart J Pharm & Pharmacol, 7 (1934), 228
Hampshire, C H
Note on sulphuric acid test for liquid paraffin
Quart J Pharm & Pharmacol 7 (1934), 24
Hartley, F, and Linnell, W H
Use of diphenylamine in assay of saccharated iron compounds
Quart J Pharm & Pharmacol, 7 (1934), 219
Heading, W R
New method of analysis of some mercurial ointments
Quart J Pharm & Pharmacol, 7 (1934), 76
Heading, W R
Improved method for assay of ointment of mercuric nitrate
Quart J Pharm & Pharmacol, 7 (1934), 83
Kahane Ernest
Determination of sulphur and phosphorus in medicaments after oxidation with perchloric acid
J pharm chim, 19 (1934), 26
Neugebauer, H
Contribution to the identification of homeopathic potencies of Rubia Tinctoria and Nitras Uranicus
Pharm Weekbl, 71 (1934) 745
Page, G R
Notes on some pharmacopœial tests I Quinine ethyl carbonate, atropine sulphate, potash alum, alum, solution of cresol with soap
Quart J Pharm & Pharmacol, 7 (1934), 31
Reichert Benno
Assay of Tartarus stibiatus according to the German Pharmacopœia VI
Pharm Zentralh, 75 (1934), 437
Steinhausen
Identification of homeopathic preparations
Apoth-Ztg, 49 (1934), 791
Schulek E, and Floderer, S
Determination of mercury content of pharmaceutical mercury preparations
Z anal Chem, 96 (1934), 388
van Giffen, H J
Analytical notes from the Laboratory of the Netherlands Pharmaceutical Association
Pharm Weekbl, 71 (1934), 718
Wetherell, S
Assay of strong solution of lead subacetate
Quart J Pharm & Pharmacol, 7 (1934), 129

INORGANIC CHEMICALS

Carter F E
Preparation of a stable form of ferrous chloride
Quart J Pharm & Pharmacol 7 (1934), 59

Lucas, V
Incompatibility of sodium bicarbonate and mercurous chloride
Bol assoc brasil pharm 14 (1933), 301

ORGANIC CHEMICALS

Bird, F C J
Note of mercuric oxycyanide
Quart J Pharm & Pharmacol, 7 (1934), 251
Charpentier, Paul
Study of the system, butylethylmalonylurea (Soneryl) and dimethylaminophenol dimethylpyrazolon (pyramidon)
Bull sci pharmacol, 41 (1934), 328
Cox, Gerald, J *et al*
Solubility of calcium levulinate in water
JOUR A PH A, 23 (1934), 662
Fieser, Louis F, and Bannerot, R A
Tautomerism of aminonaphthoquinones
J Am Chem Soc, 56 (1934), 1565
Hann, Raymond M
Second synthesis of glucosidoferulic acid
J Am Chem Soc, 56 (1934), 1631
Jurist, A E, and Christiansen, W G
Comparison of neoarsphenamine and sulpharsphenamine when they are dialyzed
JOUR A PH A, 23 (1934), 686
Katz, I
Seignette's salt of the Belgian Pharmacopœia IV
J pharm Belg, 16 (1934), 573
Marshall, J
Note on preparation of pure acriflavine
Quart J Pharm & Pharmacol, 7 (1934), 184
Woodward, W A, and Pickles, J
Stability of mixtures of hydrogen peroxide and ethyl alcohol
Quart J Pharm & Pharmacol, 7 (1934) 88

PHYTOCHEMICAL LITERATURE *

BY EDWARD KREMERS

Friedrich Rochleder was born May 15, 1819, in Vienna, the son of the apothecary Anton Rochleder He died Nov 5, 1874, as professor in the University of the capital of Austria

Not satisfied with the routine of the apothecary shop, he began the study of medicine in his native city, receiving the doctor's degree in 1842 While thus engaged he took a special liking to chemistry for which his pharmaceutical apprenticeship had prepared him in part Hence, after the completion of his medical studies he went first to Prag and then to Giessen His knowledge of vegetable drugs and of botany coupled with his chemical training under Liebig caused him to specialize in phytochemistry toward which most of his experimental and literary efforts were directed

Having spent several months in Paris and London, at the age of 26 he was appointed Professor of Technical Chemistry at the Academy at Lemberg In 1849 he succeeded his friend Redtenbacher at Prag, whom he again succeeded in Vienna in 1870

A fairly complete list of his publications may be found in Poggendorff's *Biographisch-literarisches Handwoerterbuch* It is noteworthy that, whereas the more general literary productions appeared between 1847 and 1858, his activities after the latter date were restricted to more specific investigations Optimistic as he was with regard to the fundamental importance of phytochemistry to plant physiology, he realized that only a mere beginning had been made and that much more detail work was necessary before worth-while generalizations could be indulged in with profit

His literary contributions in book form are

* Section on Historical Pharmacy, A PH. A, Toronto meeting 1932 Continued from JOUR A PH A 21, 365

1847 *Beitrage zur Phytochemie*
1852 *Die Genussmittel und Gewuerze in chemischer Beziehung*
1854 *Phytochemie*
1858 *Chemie und Physiologie der Pflanzen*
1858 *Anleitung zur Analyse von Pflanzen und Pflanzentheilen*

The last was translated into English and appeared as *Proximate analysis of plants* in 1861 and 1862

The biography for the *Allgemeine Deutsche Biographie* was written by Anschuetz It is evidently based on the more detailed account written by Rochleder's student and friend, H Hlasiwetz, for the *Almanach der kaiserlichen Akademie der Wissenschaft* for 1875 (pages 195–212), of which society Rochleder had been a member since 1848 This ' Nekrolog" was reprinted in the *Berichte der d chem Gesellschaft*, for 1875, *viz* , in Vol 8, page 1702

Fr Rochleder—Beitraege zur Phytochemie Wien, 1847 Aus der kaiserl koenigl Hof- und Staats-Druckerei One vol 8°, pages 51

This is Rochleder's first attempt to rationalize the numerous observations made in the chemical study of plants and parts of plants Liebig's theory of radicles, the "true elements" of organic compounds, afford him the means of studying the structure of phytochemical substances and of seeking genetic relationship between them That, with the limited number of radicles known at the time, there should be so many organic substances produced in the vegetable kingdom, he attributes not only to their capacity to combine with different elements and radicles, *e g*, oxygen, sulphur, cyanogen, sulphocyanogen, etc , but above all to their capacity to form "gepaarte Verbindungen" such as salicin, amygdalin, etc (page 22)

The complaint that so much of phytochemical investigation has been merely qualitative and not quantitative is readily understood when one considers that elementary organic analysis, as simplified and perfected by Liebig, had been in use for about twenty years It finds expression in the small number of phytochemical substances enumerated with their formulas The modern chemist, however, will be impressed less with the paucity of formulas than with the daring formulas assigned to pectin and other members of the "carbohydrate group "

Following the trend of v Uslar and de Saussure, more than half of the small treatise is devoted to what is generally conceived as phytophysiological considerations In the biochemistry of the plant he recognizes desoxidation as the principal function or chemical process of plant metabolism

Inasmuch as this treatise has become rare, the table of contents may here be given

Ueber die Zusammensetzung der organischen Bestandtheile der Pflanzen im Allgemeinen (pages 7–11)

Ueber die Zusammensetzung der Pflanzenstoffe im Besonderen (pages 11–22)

I	Familie	Kohlehydrate	VIII	Familie	Bioxyde
II	Familie	Fettsäuren	IX	Familie	Æther
III	Familie	Gerbstoffe	X	Familie	Acrodyle
IV	Familie	Lichenyle	XI	Familie	Albuminoide
V	Familie	Tetryle	XII	Familie	Alcaloide
VI	Familie	Decatryle	XIII	Familie	Gepaarte Verbindungen
VII	Familie	Camphene			

Ueber die Metamorphosen welche die Stoffe in den Pflanzen während des Lebens derselben erleiden (pages 23–45)
Einjahrige und perennirende Gewachse (page 46)
Ueber die Vertheilung der Pflanzenstoffe in den Pflanzen (pages 47–49)
Schluss (pages 49–51)

Fr Rochleder—Phytochemie Leipzig Verlag von Wilhelm Engelmann, 1854

This attempt at a general phytochemistry in which the author was the pioneer, is best revealed by the table of contents The bulk of the work is devoted to a record of constituents, by no means all chemical units, that had been isolated from plants The author points out that the gaps are much more numerous than the known constituents and he indicates constantly where more work seems desirable and profitable This part of the book is, therefore, a sort of precursor to Wehmer

Part three is in its essence an attempt to bring out genetic relationships with reference to the several families Even before Kekulé's theories were advanced, he endeavors to bring out what was regarded as structural relationship at that time

Part four has to deal largely with what we call plant metabolism, of some of the details of which the following table of contents will give further indication

Einleitung
Erster Abschnitt Analysen der Pflanzen mit besonderer Rucksicht auf ihre organischen Bestandtheile (pages 1–250)
Zweiter Abschnitt Analysen der Pflanzen, mit alleiniger Berücksichtigung ihrer unorganischen Bestandtheile (pages 251–255)
Dritter Abschnitt Ueber den Zusammenhang zwischen der Form und Zusammensetzung der Gewachse (pages 257–308)
Vierter Abschnitt Der Stoffwechsel in den Pflanzen (pages 309–344)

I Nahrungsmittel der Pflanzen
II Bestandtheile der Pflanzen
III Metamorphosen in den Pflanzen
IV Bewegung der Stoffe und ihre Folgen
V Einfachheit der Zusammensetzung der Pflanzen
VI Das Verhaltniss der organischen zu den unorganischen Bestandtheilen der Vegetabilien
VII Perioden im Stoffwechsel
VIII Pflanzengeographie

Anhang (pages 345–370)
Alphabetisches Verzeichniss der bis jetzt, ihrer Zusammensetzung nach, bekannten Bestandtheile der Pflanzen
Index familiarum
Index generum

Reviews of this work may be found in the following journals

Arch de Pharm, 133, 335, by H Bley (8 pages)
Neues Jahrb f Pharmacie, 18 355 by Remsch

Fr Rochleder—Chemie und Physiologie der Pflanzen Heidelberg Karl Winter, 1858

In this, his last attempt, the author discusses phytochemistry from two points of view, namely, that of chemical botany, and that of the chemical physiology of plants

In the first part, which constitutes the major portion of his treatise, the chemical constituents of plants, as revealed by so-called plant analysis, are arranged

according to botanical families, genera and species In this respect he supplements the first part of his *Beitræge zur Phytochemie* However, what, in the first attempt, is regarded as one of the principal aspects of phytochemistry, namely, the genetic relationship of chemical compounds based on their structure, receives no consideration whatever His chemical botany is but a catalog of phytochemical substances with references to original literature for details

The character of the second part becomes sufficiently apparent from the table of contents It also goes into much greater detail than his *Beitræge* of 1847 The object of the chemical physiology of plants is to investigate "which substances are taken up by plants from without, which products are produced therefrom by the plant, the method by which the plant metamorphoses the substances taken up from without, and the products that are secreted by the plant "

The contents of the volume are herewith revealed

Einleitung (pages 1–7)

(A) Chemische Botanik (pages 7–98)

Analysen vegetabilischer Körper

I Vegetabilia dicotyledonea
II Vegetabilia monocotyledonea
III Vegetabilia vascularia cryptogama
IV Vegetabilia Cellularia

(B) Chemische Physiologie der Pflanzen (pages 99–152)

I Endprodukte des Stoffwechsels
II Nahrungsmittel der Pflanzen
III Aufnahme der Nahrungsmittel und Vertheilung der Stoffe in den Pflanzen
IV Ueber den aufsteigenden und absteigenden Saftstrom
V Eigenwärme der Gewächse und Bedeutung der Warme und des Lichts fuer die Pflanzen
VI Licht
VII Electricitat
VIII Keimen der Samen

Anhang Ueber das Reifen der Früchte (pages 153–154)

AUGUST HEINRICH HUSEMANN

The younger of the two cousins Husemann was born Sept 5, 1833 in Stolzenau, Hannover, then an independent kingdom His early education he received in private institutions and at the gymnasium in Detmold In 1848 he was apprenticed to the court apothecary in Detmold Later he acted in the capacity of assistant in Lamspringe, Aurich and Nienburg In 1857 he became a student at Goettingen where he passed the state board examination in the following year Devoting himself to the study of chemistry, he worked under Woehler and Limpricht and in 1860 was appointed assistant at the newly equipped physiological chemical laboratory In the same year, Aug 8th, he received the doctor's degree and in 1862 he became docent for pharmaceutical-juridical chemistry

Lung troubles necessitated residence in Italy during the winter of 1863/64 He returned to Goettingen but for a short time, having received a call to the "Kantonschule" in Chur Whereas in Goettingen his researches were devoted to phytochemistry, in Chur they dealt with the investigation of the mineral waters of Graubuenden Poor health necessitated his withdrawing from active work He died in Thusis (Graubuenden, Switzerland) July 17, 1877

A list of his book and journal publications will be found in Poggendorff, *Biogr lit Handwoerterbuch*, Bd III

Phytochemically his *Pflanzenstoffe*, which appeared in 1870–1871, is his principal contribution to scientific literature It was well received A second edition which appeared after his death, 1882, was edited by A Hilger and Th Husemann

The biographical sketch in the *Allg Deutsche Biographie*, by A Ladenburg, is based on the obituary in the *Arch Pharm*

ALBERT HILGER

Born May 2nd in Hamburg, Rhenish Palatinate, he served his pharmaceutical apprenticeship with the apothecary Joh Hoffmann in Langenkandel, Rhenish Palatinate Having passed his assistant's examination, he served for three years in this capacity in Mannheim, Karlsruhe and Saarbruecken He studied in Wuerzburg (1860) where he passed his "Staatsexamen" in 1862, also at Heidelberg, at which university he received his doctor's degree (Ph D) He then became Schenk's assistant in Wuerzburg, later the assistant to Scherer, and in 1869 "Privat-docent " In 1872 he was appointed Professor of Pharmacy and Applied Chemistry in Erlangen Twenty years later he became Buchner's successor in Munich He died May 18, 1905, in Possenhefen on the Starnberger lake

For additional biographical data with portrait, also for a long list of his book and journal publications, see B Reber, *Galerie*, etc , pages 218 and 363 An appreciation, more particularly of his life-long interest in pharmacy and food chemistry was written by Heger, editor of the *Pharmaceutische Post*, No 23, 1905

Poggendorff gives but a brief notice of his life and work (Bd III) The *Allgem Deutsche Biogr* does not mention him

THEODOR HUSEMANN

The older of the Husemann cousins was born Jan 13, 1833, in Detmold, Lippe From his father, an ex-apothecary whose hobby was botany, he acquired a love for the natural sciences These he studied, in addition to the required medical subjects at the universities of Goettingen (1850–1852), Wuerzburg (1852–1854) and Berlin (1854) From the last-named institution he received the M D , Dec 27, 1854

After several years as medical practitioner, he returned to Goettingen devoting himself to toxicological and pharmacological studies During the winter 1863–1864 he accompanied his sick cousin to Italy Early in 1865 he became "Privat-docent" for Pharmacology and Toxicology at the *Georgia Augusta* and in 1872 he was made professor

As medical practitioner, Husemann became active in a literary capacity writing on various subjects of medical history As toxicologist and pharmacologist he wrote extensively on subjects related to these fields With his cousin he edited the first edition of the *Pflanzenstoffe* (1869–1871) After his cousin's death, a second, enlarged edition was published in cooperation with A Hilger A promised third edition did not make its appearance

He died Feb 13, 1901

For more detailed biographical data with portrait, also references to other publications, see B Reber, *Galerie*, etc (1897), 63

Poggendorff contains but a brief note on his life and literary activities The *Allgem Deutsche Biogr* does not mention him

A more extensive biographical account will be found in the *Pharmazeutishe Zeitung* see 32 (1887), 443 and 451, also 46 (1901), 147

Aug Husemann, und *Theod Husemann—Die Pflanzenstoffe in chemischer, physiologischer, pharmakologischer und toxikologischer Hinsicht* Fuer Aerzte, Apotheker, Chemiker und Pharmakologen bearbeitet One vol, pages VII, 1178 Berlin, 1871 Verlag von Julius Springer

One of the authors, presumably August H, undertook the editing of the chemical part of the work, the other, presumably Theodor H, that of the pharmacological, etc, parts of the volume While such mixtures as volatile and fatty oils, resins, etc, receive consideration, extracts and other galenical preparations of plants are excluded The book apparently filled a long-felt want on the part of chemist and apothecary though it was also written for the medical profession

The arrangement, of special interest so far as date of publication is concerned, becomes apparent from the table of contents

Einleitung		1– 18
(A)	Reine Verbindungen	
	1 Die Pflanzenbasen oder Alkaloide	19– 522
	2 u 3 Die Pflanzensaeuren und indifferente Pflanzenstoffe	523–1073
(B)	Gemenge	
	Aetherische Oele—Harze—Fette	1074–1167
Register		1069–1178

As a means of subclassification the plant substances are arranged according to plant families

Contemporary appreciation and criticism of this work may be learned from the following book reviews

Arch Pharm, 194, 282 By E Hallier

Am J Pharm, 42, 315 By J M Maisch

After the death of Aug Husemann in 1877, his cousin associated himself with A Hilger Of the three authors of *Die Pflanzenstoffe*, two began their scientific careers as pharmacists The third was the son of an ex-apothecary and had inherited from his father a love for the natural sciences which he cultivated while pursuing his medical studies The second edition was published in two volumes The arrangement of the subject matter was altered as becomes apparent from the rearranged table of contents

I ALGEMEINER THEIL

(A) Chemische Vorgaenge im pflanzlichen Organismus
Entstehung organischer Substanz (pages 3–11)

(B) Chemische Charakteristik der Pflanzenstoffe (pages 12–72)

Kohlenhydrate
Glycoside
Bitterstoffe und Farbstoffe
Gerbsaeuren (Gerbstoffe)
Pectinstoffe
Pflanzensaeuren
Die Pflanzenbasen oder Alkaloide
Fette (Wachsarten)
Aetherische Oele
Campher
Harze (Balsame)
Proteinstoffe

(C) Wirkung und Anwendung der Pflanzenstoffe (pages 73–100)

II SPECIELLER THEIL

(A) Allgemein verbreitete Stoffe

1 Unorganische Bestandtheile der Pflanze (pages 103–105)
2 Kohlenhydrate (pages 106–188)
3 Organische Saeuren allgem Verbreitung (pages 188–261)
4 Eiweisstoffe (Proteinkoerper) (pages 231–236)
5 Ungeformte Fermente (pages 237–240)
6 Pflanzenfarbstoffe (pages 241–261)
7 Amidoverbindungen (pages 263–272)
(B) Pflanzenstoffe beschraenkter Verbreitung (pages 273–1543)

It is also noteworthy that the bulk of the treatise is devoted to plant substances of limited distribution Apparently it was Hilger who edited the chemical part after the death of Aug Husemann

Book reviews may be consulted in the following journals

Pharm Ztg, 29, 323 By A Tschirch

E EBERMAYER

Ernst Wilhelm Ferdinand Ebermayer was born Nov 2, 1829, in Rehlingen near Pappenheim, Bavaria His life work in forestry was carried on primarily as professor at the *Forstlehranstalt* at Aschaffenburg (since 1858) and at the University of Munich (since 1878) He is referred to as the founder of forest meteorology and forest chemistry For his book and journal publications on these and related subjects, see Poggendorff, *Biogr —litterarisches Handwoerterbuch* Bd III, page 396 His *Physiologische Chemie der Pflanzen* appeared in 1882 He died Aug 12, 1908, in Hintersee near Berchtesgaden

The *Allgem Deutsche Biogr* does not include his biography Brief accounts will be found in the *Konversations-Lexika* of Brockhaus and Meyer See also the supplement to the latter

Physiologische Chemie der Pflanzen Zugleich Lehrbuch der organischen Chemie und Agrikulturchemie fuer Forst- und Landwirthe, Agrikulturchemiker, Botaniker, etc Von Dr *Ernst Ebermayer* Erster Band Die Bestandtheile der Pflanzen Berlin Verlag von Julius Springer 1882

Inhaltsübersicht

Die Bestandtheile der Pflanzen
Erster Abschnitt Wassergehalt der Pflanzen (Vorkommen, Vertheilung, etc quantitative Bestimmung, pages 2–29)
Zweiter Abschnitt Die organischen oder verbrennlichen Bestandtheile der Pflanzen (pages 30–708)
Allgemeine Betrachtungen
(A) Die stickstofffreien Erzeugnisse der Pflanzen
I Verbindungen aus der Klasse der Fettkorper
Kohlenwasserstoffe
Alkohole
Kohlenhydrate
Organische Sauren
II Verbindungen aus der Klasse der aromatischen Körper
Kohlenwasserstoffe
Phenole
Aromatische Alkohole and Aldehyde
Aromatische Säuren

A METHOD OF PREPARING GLYCERITE OF STARCH *

BY F L GEILER

INTRODUCTION

The purposes of this article are (1) to describe a simplified method of preparing Glycerite of Starch, (2) to show wherein this method differs from the present U S P X method of preparing this glycerite, and (3) to show why the difference or differences mentioned above will be advantageous

The writer has, for a number of years, assigned Glycerite of Starch as one of the preparations to be made by students in the laboratory The observations made over this period of years led to the conclusion that undue difficulty was being experienced by the students in making a comparatively simple preparation The trouble met with has been primarily that of obtaining a smooth, opalescent, translucent product by following the directions given for this preparation in the U S P X This primary difficulty usually has led to one of a secondary nature due to the effort made to obtain a temperature of around 140° C with the resultant scorching of the glycerite Upon questioning the students, almost invariably the scorching has been found to be the result of the use of high heat under the impression that it will eliminate the lumpy condition of the glycerite which has developed because of following the directions as given in the U S P X

During the time referred to above many students used the method of the U S P X and repeated the experiment as high as three or four times before a satisfactory glycerite was obtained This always seemed to the writer an uncalled-

* Section on Practical Pharmacy and Dispensing, Washington meeting, 1934

for waste of time and materials on a preparation which, as has been said before, should be rather simple

EXPERIMENTAL WORK

The conditions and results, as generally outlined above, led the writer to conduct experiments on this preparation At first one group of students was allowed to prepare the glycerite as directed in the U S P X The results were very unsatisfactory, many repetitions occurring due to a lumpy or a discolored preparation The same group was then directed to prepare the same glycerite by the method to be described subsequently The results obtained by using the second method were practically 100% as to smoothness, opalescence and translucency The above methods of preparation were repeated a year later and the same results obtained The writer, personally, has performed the same experiments with the resultant corroboration of those given above

The method proposed is as follows Ten grams of starch were weighed out and mixed with 20 cc of cold water until a homogeneous mixture was obtained Glycerin, to the volume of 70 cc , was poured into a small evaporating dish The aqueous starch mixture was then added to the glycerin and the entire volume was stirred until homogeneity was again obtained The evaporating dish and contents were then placed in a sand-bath on an electric hot plate The temperature was so regulated that the heat increased rather slowly and the preparation was stirred almost constantly The highest temperature registered inside the evaporating dish was 110° C The total time of making the glycerite, from weighing and measuring to removing from the hot plate, inclusive, was just one hour Equally satisfactory results can be obtained by using a Bunsen Burner in place of an electric hot plate

CONCLUSION

In view of the foregoing, I wish to call attention to the following conclusions

(1) The proposed method of preparation is less troublesome than that used in the U S P X

(2) This method requires practically no care other than constant stirring and temperature control

(3) Lumpiness and discoloration in the finished product are eliminated due to the fact that all ingredients are heated together at the same time and to the same temperature

(4) The present U S P X method is unsatisfactory because it gives a lumpy product and possibly a discolored one, due to the glycerin being heated far above the aqueous starch mixture when the latter is added

LABORATORY OF THE PHARMACY DEPARTMENT,
WEST VIRGINIA UNIVERSITY MORGANTOWN, W VA

A JAPANESE PHARMACIST MUST CERTIFY IMPORTED MEDICINALS AND CHEMICALS SOLD IN JAPAN

The marketing of cosmetics, manicure preparations and medicinal preparations in Japan is contingent upon the issuance of a government license for such sale A license may be obtained by submitting samples to proper authorities accompanied by a chemical analysis of the product which has been certified to by a licensed Japanese druggist (Consul General Garrels, Tokyo)

A STUDY OF VEHICLES FOR MEDICINES *

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

VII AROMATIC SYRUP OF ACACIA

In the course of our studies on vehicles we have secured abundant proof that colloidality has distinct disguising value We, therefore, became interested in syrup of acacia which might be taken to represent colloidality to as high a degree as can be found in any pharmaceutic preparation

The deletion of this syrup from U S P VIII might possibly count against it in consideration as an eligible vehicle This deletion, we believe, was chiefly due to its poor keeping qualities In spite of the deletion, however, its usage, as shown by the Gathercoal survey, has been 15 per 10,000, which would entitle it to admission to the National Formulary merely on the basis of its use

That the syrup of acacia has disguising value can very easily be proved among other ways, by the following prescription for urea as a diuretic

℞	Urea	15 0 Gm
	Syrup of Acacia to make	60 0 cc

M and label Teaspoonful in water every 4 hours

The taste of urea is sharp and much more disagreeable when the solution is made with simple syrup instead of the syrup of acacia Similar results could be secured with any readily soluble and highly diffusible medicament, that has no intrinsically unpleasant taste We were indeed unable to find anything that was superior to or as good as the syrup of acacia for the disguising of urea, excepting that the lack of flavor gave one the impression of "flat taste" which might be possibly one of the reasons why the syrup of acacia is not more popular

We felt, therefore, that, to improve the syrup of acacia and increase its utility, we would have to do two things *First,* impart to it keeping qualities, and, *secondly,* give it a pleasant flavor

To improve the keeping qualities of this syrup, we increased as a first step the proportion of sugar from 80 to 85 parts per 100 which can be done by merely dissolving the powdered acacia directly in the syrup there being no necessity of dissolving the acacia separately as was done in U S P VIII To make assurance doubly sure, however, we would suggest the addition of 1 to 1000 of sodium benzoate, so as to protect the medicine against spoiling, even if the doctor had to use a little water in order to dissolve the medicament he intends to introduce in the syrup

It is strange that the delicious wintergreen flavor has thus far not been made use of in the production of vehicles After trying a number of flavors, it seemed clear to us that methyl salicylate was the ideal flavoring vehicle for the syrup of acacia, and we have the belief that, by using it for making the syrup of acacia more pleasant, we are at the same time enriching our flavoring resources to an important degree

As a result of these considerations and on the basis of our experimentations we herewith, respectively, suggest the following formula for admission to either the United States Pharmacopœia or the National Formulary

* From the Laboratory of Pharmacology of the University of Illinois, College of Medicine

SYRUPUS ACACIÆ AROMATICUS

Aromatic Syrup of Acacia

Syr Acac Arom

Acacia, in fine powder	100 0 Gm
Sodium Benzoate	1 0 Gm
Methyl Salicylate	1 0 cc
Syrup, a sufficient quantity, To make	1000 0 cc

Mix the acacia, placed in a dry mortar, with the sodium benzoate Add the syrup at first in small portions with active trituration, so as to avoid the formation of lumps, and, gradually, the remainder of the syrup Bring the preparation to a boil and when cool strain through cheese cloth Finally incorporate the methyl salicylate by thorough agitation and add enough syrup to make the product measure 1000 cc

---

HOW MUCH IS A TEASPOONFUL?*

BY F W NITARDY

During the last twenty years considerable effort has been made toward more accurate standardization of medicinal products Tolerances have also been developed for individual dose forms such as tablets, capsules, ampuls, etc, and these tolerances, determined upon very largely by a committee of the A D M A and A P M A, have received official sanction from the Department of Agriculture and other bodies In view of this effort for accuracy in potency and dosage, it appears wise to again give consideration to the dose measure most commonly used by the public in the use of liquid medicinal substances, namely, the teaspoon

Efforts have been made from time to time to supplant the teaspoon with an accurately graduated medicine glass, and while such idea is laudable it has met with little success, probably because of the convenience of the teaspoon and the almost universal habit on the part of the public to use it and, possibly, its belief that it represents a reasonably accurate measuring device for such purposes

Originally, a teaspoonful was considered the equivalent of the fluidram and because a fluidram is approximately 4 cc, the equivalent of 4 cc for a teaspoonful has been more or less generally accepted since the metric system became official, notwithstanding that it is quite an incorrect equivalent Unfortunately, this incorrect equivalent has official sanction, but a survey of literature indicates that attempts have been made to adopt the more nearly correct equivalent of 5 cc, also that these efforts received the approval of both the pharmaceutical and medical professions, but for some reason not clear failed in being adopted by the U S P, which still gives the approximate measure of a teaspoon as 4 cc

'Arny's Principles of Pharmacy' (Second Edition 1924) states, A teaspoonful is supposed to be one fluidrachm' Remington's Practice of Pharmacy (Seventh Edition, 1926) states A teaspoonful is estimated as 4 cc In almost all cases the modern tea cups tablespoons, dessert spoons and teaspoons after careful test by many authorities were found to average 25%

* Section on Practical Pharmacy and Dispensing A PH A, Washington meeting, 1934

greater capacity than the theoretical quantities given above" 'The American Illustrated Medical Dictionary,' Dorland (Sixteenth Edition, 1932), defines a teaspoon as "A spoon of small size containing about 1 fluidrachm or 4 cc"

In Europe the average content of a teaspoon is quite generally recognized as 5 cc, that figure being given in the French Codex, in the German Pharmacopœia VI (1926), the Danish Pharmacopœia VIII (1933) and in the Swiss Pharmacopœia (1933) The British Pharmacopœia includes a statement regarding the inaccuracy of dosages expressed in teaspoonfuls and dessertspoonfuls and recommends that dosages should be specified in terms of more definite units This Pharmacopœia does not give any capacity for a teaspoon A number of articles on this subject have been published during the present century Abstracts of these are as follows

Standardizing Dose Measures [1]—Attention is called to possible errors caused by the inaccuracy of medicine measures and that by the fact that these measures are poorly adapted for accurately measuring liquids in small quantities The author proposes certain regulations which had previously been adopted at a pharmaceutical meeting of the Philadelphia College of Pharmacy These resolutions recommended the use of graduated glass dose-measures so constructed that the heights of the contained liquid at a spoonful mark would be greater than its diameter, that where spoons are used as medicine measures, the French Codex definition of a spoonful be applied This definition reads as follows "A spoon is full when the contained liquid comes up to but does not show a curve above the upward edge or rim of the bowl The third recommendation was that 1 teaspoonful should be considered equivalent to 5 cc, 1 dessertspoonful 10 cc and 1 tablespoonful 15 cc These resolutions were seconded and adopted by the ASSOCIATION

Dose Measures and Measured Doses [2]—In a series of experiments it was shown that the average teaspoonful dose as measured with the same spoon by different people varied in measurement from 3 to 7 cubic centimeters Medicine glasses were also found to be inaccurate, varying considerably at the different graduations and most of them being so constructed that small quantities could not be measured with accuracy

The Approximate Measures of the U S P [3]—Wilbert states that the resolutions endorsed by the ASSOCIATION in 1902 were also adopted by the American Medical Association in 1903, in spite of which the members of the Committee on Revision of the U S P failed to adopt the measures recommended Wilbert made permanent casts of the capacity of a number of different sizes of spoons in common use as follows The bowl of the spoon carefully washed and perfectly dried was coated with a thin film of oil and then filled with the requisite quantity of dental plaster which had been previously mixed with sufficient quantity of water to give it the consistency of cream The spoon was supported until the plaster had set The weight of the cake was then determined and the capacity of the spoon calculated It was found that teaspoons evenly filled had a capacity of from 4 4 to 5 5 cc Wilbert recommends that the 5-cc equivalent for teaspoon be generally adopted

[1] M I Wilbert, PROC A PH A, 50 (1902) 408
[2] M I Wilbert, *Am J Pharm*, 74 (1902), 120
[3] M I Wilbert, PROC A PH A, 53 (1905), 301

The Tyranny of the Teaspoon [1]—Arguments very similar to those previously presented by Wilbert are given Arny found that capacities of 9 teaspoons ranged from 3 8 to 7 8 mils Only one of these approached the 4-mil basis All the others were closer to 5 mils than to the 4-mil mark

Standard Teaspoon Needed [2]—Examination of teaspoons of four different makes showed two to deliver 5 37 cc, one to deliver 7 39 cc and one to deliver 4 22 cc It is recommended that properly graduated glasses be used instead of teaspoons

Variation in the Capacity of Teaspoons and Other Measures [3]—Data are given showing the capacity specified by several pharmacopœias for the teaspoon, dessertspoon and tablespoon Because of the variations which occur in these specifications, the author recommends international unification Data as given showed a still greater variation in the capacities of these measures as actually found in general use

The writer checked up on capacity of teaspoons recently and found the following (Filled so the liquid is exactly level with the edge of the bowl)

1	Towle sterling teaspoon (Lady Diana)	5 0 cc
2	Community plate teaspoon (Patrician)	5 5 cc
3	Plated ware teaspoon (hotel ware)	5 0 cc
4	Plated ware teaspoon (restaurant)	5 0 cc
5	Plated ware teaspoon (5 and 10¢ store)	5 0 cc
6	Plated ware teaspoon (nondescript)	5 0 cc

It will be seen from the above that of six representative varieties of teaspoons, five hold just 5 cc and one 10% more than this It is believed that the sterling silver spoon given under "1" above is quite representative of the capacity of sterling silver spoons available in the market to-day as manufactured by Towle, International, etc, and that the community plate spoon given under "2" is probably quite representative of the better class of plated ware available in the market to-day

Aside from the above spoons, I also determined the capacity of a very old European teaspoon, definitely more than a hundred years old This spoon held 4 4 cc and it is my impression that old European spoons of this type are generally somewhat smaller and have a somewhat different shaped bowl than the teaspoon in common use in this country, but even this type of spoon seems to hold definitely more than 4 cc

It would appear that in view of the foregoing a renewed effort should be made to induce the U S P to recognize 5 cc as the most nearly correct metric equivalent for an average teaspoonful

---

[1] H V Arny, JOUR A PH A, 6 (1917), 1056

[2] John L Adams, *Bull Pharm*, 38 (1924), 17, YEAR BOOK OF THE A PH A, 13 (1924), 74

[3] A Schamelhaut, *J pharm Belg*, 8 (1926), 1, through YEAR BOOK OF THE A PH A, 14 (1925) 30

VISIT THE CENTURY OF PROGRESS

Pharmacists, visiting the World's Fair, should see the Pharmacy Exhibit and register, thereby showing their interest and loyalty to the profession

A PROFESSIONAL PHARMACY *

BY ROBERT R GAW

The McKennan Pharmacy was founded in 1861 It was located for many years at 431 Market Street, Pittsburgh In 1910, Mr O F Wolf, who worked as a boy in the store and became registered before branching out for himself, purchased a half interest in the store, and in 1914 purchased the other half

In 1914 the McKennan Pharmacy moved to its present location 506-508 Penn Avenue and at that time discontinued the sale of soda water, proprietary medicines, candy, tobacco and toilet articles These items were discontinued with the idea of attempting to operate a professional pharmacy and devote our energies exclusively to prescriptions

We mention these historical facts to better enable us to visualize the progress of this business and its evolution from an ordinary drug store to a professional pharmacy Many druggists as well as physicians from a distance, who visit the store, are under the impression that it is one of recent birth and that it represents an idea capitalized by big interests, and launched over night like the sensational developments in commercial retail stores

The McKennan Pharmacy as a professional pharmacy is a result of years of development and of a radical departure from the deeply rooted customs of a business long established as a commercial drug store This evolution was a result of adopting a policy of extremes in eliminating many of the departments and classes of merchandise usually found in average drug stores When the McKennan Pharmacy decided to omit such lines as proprietary medicines, candy, cigars, soda water, tooth brushes and all toilet articles, we did it at a single stroke, and made it our business to acquaint the physicians with this action Our intention was to impress upon them the fact that we were determined to exert all of our efforts to give undivided attention to professional pharmacy, and to render a service to the profession which we felt we could not deliver without eliminating the commercial end of our business

Personal contact is a material factor in building a professional pharmacy It is necessary to keep in personal touch with the physicians as well as your customers We are in constant contact with the members of the medical profession of Allegheny County and its environs, and also in touch with their patients as they come into the store

Many practicing physicians are not familiar enough with the Pharmacopœia and the simple pharmaceutical formulas There is no easier way for a druggist, who is attempting to establish a professional pharmacy, to obtain the confidence of the physician than by impressing upon the physician's mind a knowledge of your profession

We attribute our growth to the fact that the medical profession, as well as the public, appreciates the services rendered by a strictly professional pharmacy We do no counter prescribing, nor do we fill any family recipes We limit our activities to the compounding and dispensing of physicians' prescriptions and materials used by the physicians in their office practice In addition, we supply sick-room necessities

* Section on Practical Pharmacy and Dispensing, A PH A , Washington meeting 1934

Physicians are supplied with freshly distilled water gratis, which is greatly appreciated and although no immediate remuneration is received, their good-will and subsequent cooperation is noticeable

Since adopting the policy we have before indicated, we have never hired any pharmacists A boy enters the store as an errand boy and develops until of sufficient age to enter the school of pharmacy If his preliminary education has not been sufficient, we supply him with the opportunity of adding sufficiently to his general education to enable him to enter the school of pharmacy, and then care for all his necessary expense in completing his pharmaceutical studies until he has passed the State Board Hence our young men are always allied to, and enthusiastic for, the policy of the store It is virtually bred in them Through the adoption of this policy we have never lost one of our employees whom we have helped to educate

Few organizations have a more enviable situation in this respect There are four registered pharmacists at McKennan's, two always being on duty in the evenings and on holidays, and four on duty during the day And yet McKennan's has not hired a pharmacist in fifteen years

Commendation of our pharmacy by physician to physician and to patients, the personal interest they take in us, advertises us in a manner we could never accomplish through the daily press

Any member of the profession of pharmacy who has learned its precepts and has practiced its ethics must clearly recognize the significant value of real professional service

We do not think that the retrogressive motion so noticeable in the practice of pharmacy to-day is entirely the result of a lack of familiarity with the principles or ethics of the profession, but rather a desire to ignore these ethics because of the disposition of present-day drug stores to work along the lines of least resistance They are influenced by the apparent prosperity of the commercial drug store, where the pharmacy department is relegated to an obscure corner of an institution which has all the earmarks of a variety shop or a miniature department store

We expect within a short time to see an absolute separation of the professional pharmacy from the commercial pharmacy, with legislation covering each class as a separate institution

The druggist who aspires to be a professional pharmacist should have all the information the physician should reasonably expect Knowledge is the key-note of success in any line of endeavor, and the druggist who does not have complete knowledge of his profession cannot hope to make much impression on the members of the medical profession

Professional pharmacies are developed only through hard work and careful study of the requirements of the physician and his patients Unless you comply with these requirements, your pharmacy will always be an average drug store and the profession of pharmacy cannot number you among those who recognize the duty and responsibility of the profession

It is true, in conducting a professional pharmacy, many specialties, such as Ampuls, Solutions, Stains, etc , put up by the various manufacturers, are sold on a close margin, but by rendering this service and making it possible for the physician to obtain them, he becomes familiar with your store, sends his prescription work there, and the volume of prescription business increases to the extent that it offsets

the loss in the sale of specialties many times In other words, it is just a different form of advertising your business

To-day more than ever before, we are trying to lead the drug store back to pharmacy

A plate glass sign hanging over the prescription counter sets forth with admirable directness McKennan's merchandising policy

PRESCRIPTIONS

Purveyors to Physicians and their Patients only We do not sell Patent Medicines, Tobaccos Soda Water or Toilet Articles

All Biologicals Vaccines, Serums, Ferments, etc , are kept under Refrigeration—Ice Cooled

Unless you are sick, we have not anything to sell you That has been the store's message to the public for nineteen years

This generous policy was Mr Wolf's idea and it is standing the test of time On October 23, 1930, the McKennan Pharmacy suffered a great loss by Mr. Wolf's death after a lingering illness of thirty months The writer, who was taken in as an errand boy by Mr Wolf, wishes to pay tribute to his memory We are doing our utmost to "Carry On" the institution which his idealism so firmly established

PROFESSIONAL AND COMMERCIAL PHARMACY *

BY AQUILLA JACKSON [1]

I suppose there is no more accurate way of describing the drug store than to refer to it as a professional-commercial institution No matter how ethical it is or how extensive its professional service, there is always the commercial side to be considered In other words, a sound business foundation must underly the store in all of its departments and branches

I believe this conception of the drug store is sound and fully consistent with the high purpose it is to serve The difficulty is, too many pharmacists have lost their sense of proportion and have sought to develop the drug store as a commercial institution only This practice has been carried to shocking extremes Every conceivable kind of merchandise has come into the drug store, it has become the subject of ridicule and criticism This, to me, is simply a public interpretation—that the pharmacist is little short of a fool in his extreme commercial practices

Several years ago, in fact early in 1930, the firm represented by the writer conceived the idea that it could render better pharmaceutical service by separating the business of the store into two divisions, one professional and confined to prescriptions, drugs and medicines and the closely and directly related side-lines, and the other, consisting of the soda fountain, cigar and candy departments, magazines, etc Fortunately, we had plenty of space

The large store room was divided by a partition reaching to the ceiling At each end were archway openings, permitting free access from room to room Two

* Section on Practical Pharmacy and Dispensing, A PH A Washington meeting 1934

[1] Retail pharmacist, Baltimore Md

entrances from the street were provided, one leading directly to the professional pharmacy, and the other to the commercial room This move, at first experimental, has turned out to be very satisfactory We have had any number of favorable comments from physicians and the public

From the beginning, our clientele seemed to feel that we had recognized a practical situation and had sought to meet it as best we could Our problem was how to conduct a professional and commercial calling in the most satisfactory manner

The advantages of our arrangement are many For instance, a person seeking drugs and medicines, or desiring to have a prescription compounded, or to purchase some sick-room necessity can come to our professional division and be served by a competent pharmacist There is no need to look around in an effort to ascertain who is the cigar clerk or the pharmacist This thought, simple and trifling as it may appear, is really important It emphasizes that the needs of the customer will be met by a competent pharmacist Also the noise and distraction almost invariably associated, at certain hours of the day at any rate, with the soda fountain trade, is conveniently confined to a separate room Young people, and older ones, too, come to the fountain, read, smoke and visit without interfering in any way with any other division of the store

Even with this arrangement we have never thought that we could go the limit in commercial lines We confine ourselves to the more or less traditional side-lines After all, we are pharmacists, and we have tried to conform to professional standards, recognizing quite frankly that we had to deal with conditions as they actually exist

I think pharmacists have made a tragic mistake in not recognizing the public interest in the drug store In coming to this conclusion, I have noted more times than once that subconsciously, perhaps, but none the less definitely, people react adversely to too much commercial emphasis in a drug store People seem to look upon certain phases of a drug store as something essential to them, something which means a great deal when sickness comes, and which they feel they can depend upon when required to do so This is true to a much greater degree than we as pharmacists seem to appreciate It is this same professional regard which people give to us that raises pharmacy to a professional plane On many occasions I have heard people pay complimentary references to drug stores of a high type, and I have heard many, many adverse criticisms of the other kind that use pharmacy as a cloak for a high-powered commercial exploitation Each reference springs from a high regard for pharmaceutical service and to a wide-spread public objection to associate it with a too flagrant commercial practice

We have persistently refused to handle beverage intoxicants, and we have kept our store scrupulously free from slot machines of all kinds While there may be many who do not object to such things in drug stores, it has been our experience that the greater part of the public are opposed to them If we did not feel that they were objectionable, we would still exclude them from our store, as a matter of principle We are selfish enough to believe that sooner or later the public will discriminate, and that what might appear to be profitable now may prove to be a decided loss later, there may be exceptions, due to peculiar geographical conditions, but generally speaking, I do think that some of us have gone too far

Much has been said during the last few months with reference to open prescription counters In my opinion and from expressions of others this is receiving much favorable comment, however, I would like to offer a few personal criticisms *First,* is it consistent to bring before the public the vital part of our stores without taking into consideration the general appearance of our stores? In other words, can we expect to educate the public properly by continuing to handle the type of merchandise which really has no place in public health? *Second,* if the prescription counter is open and the pharmacist is in full view of the public, will it not be embarrassing on those occasions when a prescription is badly written (and very frequently they are) and you decide that it is necessary to contact the physician before filling the prescription? What impression will this make on the person watching you?

I am heartily in favor of educating the public along these lines, I think the open prescription department is a fine thing, but that it should be worked out in a practical way, taking many things into consideration

In conclusion, I would like to tell you how I feel about the future of pharmacy I shall begin by asking questions *First,* are we necessary to public health? *Second,* how necessary are we? The answer to the first is obvious, the answer to the second question will decide about our future As I see it, every single accomplishment in pharmacy in a legislative sense has been due to our efforts to bring the importance of its effect on public health before the lawmakers It is the only thing that we have and can truthfully call our own When the number of drug stores that are needed for public health service only (and I mean drug stores in every sense of the word) are functioning, it is then and then only that most of our problems will be solved

---

DETERMINING COST *

BY C LEONARD O'CONNELL

Recent developments in retail codes have focused the attention of the public and business men upon the problem of ascertaining the cost of the merchandise to the retail distributor Strange as it may seem to competent and unbiased observers the approach to the entire problem is quite uneconomic A careful consideration of the facts involved in the matter amply warrants this conclusion

The New Deal, as it has happily or unhappily been designated by its champions, is ostensibly based upon what they choose to call a planned economy In intent we were led to believe that the codes were designed to root out unfair practices In their operation, particularly as they relate to the drug field, it begins to appear as if we are giving legislative sanction to and are perpetuating a system that is not only uneconomic but at the base is ethically unsound An unprejudiced observer studying the facts at first hand might with all justice conclude that what we need in pharmacy in place of ineffective codes is just some old-fashioned honesty

The orderly and economic flow of merchandise from its source to the ultimate consumer demands and should make use of the three agencies, that is, the manu-

* Section on Commercial Interests A PH A , Washington meeting 1934

facturer, the wholesaler and the retailer Until recent times this plan was the accepted mode of distribution With the rapid increase of the modern merchandisers who based their appeal for patronage chiefly upon price appeal through deep cut rates upon standard commodities as "loss leaders" there grew the urge among the more aggressive to eliminate the wholesaler in order to garner for themselves this legitimate distribution cost

This group of so-called direct buyers has increased to such a degree as to constitute a real problem when it comes to the point of determining the cost of merchandise That is, we have different classes of ultimate distributors, from the standpoint of buying, whose basic costs radically differ In consequence of this, an observer needs no great reasoning ability to see that any minimum price that equals or approximates the cost to small retail distributors affords a considerable margin to the group who can buy more advantageously

Few small distributors seem to recognize that having a legal right to purvey something at the basic cost to them with the added privilege of paying for the opportunity of distributing such commodities is a pretty empty victory It is certainly uneconomic to expect the ultimate distributor to defray the cost of retail distribution To argue about the wide distribution and use of the commodity is beside the point, because unless the retailer is using such commodities as bait there can be no profit in such transactions, however considerable

If the large unit distributors who prate about their more efficient methods of distribution were able to demonstrate their ability to get all the commodities they offer to the consumer at a great saving, there would be some merit to the argument that they can afford to distribute for less

Contrary to this, however, it might be baldly stated that the plan in brief is to supply well-known merchandise at a price of cost or less with the overt intention of driving home in the public mind that all such merchandise is sold upon a similar basis which we know in practice is decidedly not so This covert underselling plan is only successful to the extent that such distributors can sell "own brand" items at unusual profits to offset losses from standard underpriced articles

Why have not those whose business it is to see that proper codes and fair practices in retailing be the order, approached the problem from an economic viewpoint and establish minimum prices that tend to conform to prices that might well come about in an honest and orderly economy? In other words the tendency of fair competition, even when highly aggressive, always tends toward the level of normal price, which price is the cost of the merchandise plus the expense of selling In other words keen competition tends to reduce and finally to rule out net profits In no case would fair competition go to the point of demanding the expense of retail distribution to be borne by the retailer himself

The NRA was designed to afford more jobs and to increase wages One might with justice ask how such a thing can come to pass unless the individuals operating the businesses at least get the cost of the item plus the amount required to sell it

Original prices of $1, $0 50 and $0 25 come to have little standing in the minds of consumers who customarily have purchased such item at about 60% of the advertised price In the final analysis an item is only worth what it will command in the open market, and if manufacturers have permitted their goods to be tossed

about steadily losing original value in the public mind, the burden for restoration is upon them rather than upon the small retailer

Frankly, the matter is one easy of solution If the majority of retailers would refuse to distribute items that do not carry their costs of distribution the problem would speedily be solved Any item of unusual appeal has only gained this through the fact that the even flow of goods from manufacturer to consumer was maintained Just as soon as a considerable number of the ultimate distributors do not afford their service in distribution much of this appeal will be speedily dissipated

From any point of view neither the manufacturer nor the ultimate consumer should expect the dealer to pay for the cost of retail distribution This cost should be borne by the consumer and would be gladly assumed by him if prices were properly set

In other words, fairness and common sense would seem to argue that the ultimate consumer, while entitled to all the benefits of efficient distribution, certainly should be the one to pay for all the expense connected with the business of supplying him with his needs

Briefly, the fair minimum price for any commodity should be the basic cost of the item plus the honest efficient cost of selling Certainly most people would agree that any retail drug business no matter how efficiently operated, would require not less than 20% of the sales for expenses

Upon this basis the minimum resale price of any item is easily computed If an item costs $4 per dozen it would be sold for $5 per dozen or $0 42 per unit which price would absorb the 20% overhead or cost of doing business In the case of $8 per dozen it would sell for $10 a dozen or $0 83 per unit In a similar manner it could be extended to all classes of rapidly selling advertised merchandise Such a plan would not interfere with the volume sale of any product and would be an economic procedure in that all factors engaged in the distributive scheme would be assured compensation for the actual service rendered

In conclusion might it not be well again to remind the small retailer that such a plan will come about only to the extent that the manufacturers feel that the small retailers are earnest in their opposition to the perpetuation of a scheme that is not only ethically unsound but is also economically indefensible

---

WILLIAM LONGSHAW, JR.,* NAVAL SURGEON AND PHARMACIST, A HERO OF THE CIVIL WAR

BY LOUIS H RODDIS [1]

This sketch is an attempt to bring to your attention a former member of the AMERICAN PHARMACEUTICAL ASSOCIATION, who is one of the forgotten heroes of the Civil War When serving as an assistant surgeon in the Navy on the U S S LEHIGH he showed outstanding courage and devotion to duty in an engagement with Confederate batteries on Sullivan's Island on November 16, 1863 Under the

* Section on Historical Pharmacy, Washington meeting, 1934

[1] Commander, Medical Corps, United States Navy

fire of nine batteries in which the LEHIGH was struck 22 times, it was necessary to pass a hawser to the U S S NAHANT which had grounded The lines from the first two hawsers were carried by Longshaw in a boat manned by gunner's mate George W Leland and coxswain Thomas Irving Twice the hawser was shot away The LEHIGH was eventually floated and saved His gallantry on this occasion received official recognition The commanding officer of the LEHIGH in his report of the action says "I would especially mention the valuable service voluntarily rendered by Assistant Surgeon Longshaw "

The officer commanding the South Atlantic Blockading Squadron, Rear Admiral Dahlgren, in his report to the Navy Department states that "Twice he passed in a small boat from the LEHIGH to the NAHANT carrying a line bent on the hawser The shot and shell from cannons and mortars were flying and breaking all around " The Admiral gave appointments as acting master's mates to the two petty officers who rowed Doctor Longshaw on this perilous duty, recommended Longshaw to the notice of the Department as having risked his life as a volunteer in order to save a valuable vessel, and issued a general order commending the officers and men who took a prominent part in the saving of the NAHANT, directing it "to be read on every quarterdeck of the fleet at the next general muster after its reception "

WILLIAM LONGSHAW JR

The Secretary of the Navy, Mr Gideon Wells, acknowledged Longshaw's conduct with a letter of commendation which was made the subject of another general order by Admiral Dahlgren to be read on the quarterdeck at muster so that in the words of Longshaw's biographer, the late Medical Director Gatewood, "the gallant conduct of Doctor Longshaw was published twice on the quarterdecks of perhaps 60 vessels of the Navy "

Now what should interest us particularly about this brave young man was that prior to studying medicine he was a practical pharmacist Furthermore, while studying medicine at the University of Louisiana he worked as a drug clerk at Bayou Lara for 12 months He obtained his medical degree at the University of Michigan in 1859, with a special diploma in chemistry and pharmacy Doctor Gatewood alleges that he became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION [1] In other words, he was a member of our own ASSOCIATION

Longshaw showed himself a hero at the engagement with the batteries on Sullivan's Island He showed himself again a hero in his death at the assault on

[1] ASSOCIATION records show that William Longshaw became a member in 1858 —*Editor*

Fort Fisher on June 15, 1865 [1] The report by the officer commanding the landing party from the MINNESOTA states "Assistant Surgeon William Longshaw, Jr, after adding to the reputation for bravery which he gained under fire of the batteries at Charleston while serving on board the iron-clad LEHIGH, was shot by the enemy as he was binding up the wounds of a dying man Their dead bodies were found lying side by side the next morning" The fleet captain, K R Breese, in his report states "Of Assistant Surgeon William Longshaw special mention should be made on account of his great bravery and attention to the wounded under the hottest fire, until finally he fell a victim in the very act of binding up the wounds of a marine"

A distinguished eye-witness, Rear Admiral Thomas O Selfridge, in his account of the attack on Fort Fisher in "Battles and Leaders of the Civil War," describes the death of Longshaw as follows "While kept under the walls of the fort, I was an eye-witness to an act of heroism on the part of Asst Surgeon William Longshaw, a young officer of the medical staff, whose memory should ever be kept green by his corps, and which deserves more than this passing notice A sailor, too severely wounded to help himself, had fallen close to the water's edge and with the rising tide would have drowned Dr Longshaw, at the peril of his life, went to his assistance and dragged him beyond the incoming tide At this moment he heard a cry from a wounded marine, one of a small group who behind a little hillock of sand close to the parapet, kept up a fire upon the enemy Longshaw ran to his assistance and while attending to his wounds was shot dead What made the action of this young officer even more heroic was the fact that on that very day he had received a leave of absence, but had postponed his departure to volunteer for the assault"

I draw your attention to that phrase of Admiral Selfridge's—"*Whose memory should ever be kept green by his corps*" As he was, too, a member of the AMERICAN PHARMACEUTICAL ASSOCIATION, I am glad to make him known to-day at a meeting of the ASSOCIATION that it, too, may honor his memory

Robert Louis Stevenson's famous eulogy of the medical profession is well known There is a tribute to the military surgeon which should be equally well known It was written by one of the most brilliant men of our generation in a forgotten book about a forgotten war It is a peculiarly fitting tribute to repeat in connection with the death of this heroic naval surgeon and pharmacist "The profession of medicine and surgery must always rank as the most noble that men can adopt The spectacle of a doctor in action among soldiers, in equal danger and with equal courage, saving life where all others are taking it, allaying pain where all others are causing it, is one which must always seem glorious, whether to God or man It is impossible to imagine any situation from which a human being might better leave this world, and embark on the hazards of the Unknown"

President Roosevelt participated in the ceremonies in which the American Legion presented to the brothers Dr William J Mayo and Dr Charles H Mayo, citations voted at the last national convention honoring them for their humanitarian services Dr Charles H Mayo is honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION

[1] PROCEEDINGS A PH A for 1865 concur and give his age as 28 years

DETAILING FOR PRESCRIPTIONS *

BY FRANK B KIRBY

Generally speaking the first consideration in developing a prescription pharmacy is a realignment of the internal arrangement of the store It is easily recognized that there is a rapidly growing sharp line of demarcation between the merchandising or commercial drug store and the professional pharmacy There is no question that the ordinary luncheon counter has no place in the latter although the professional pharmacy in a Medical Arts Building might render an acceptable and approved service to the doctors of the building if they catered to a light lunch only

However, to put a real meaning back of the sign "Prescriptions a Specialty" such a store must not be satisfied with eight per cent floor space for prescriptions and twenty-five or more per cent floor space for lunches

If we are to aim for a basis of prescription returns at least fifty per cent of the total income, then we must actually specialize in as many ways as possible We must bring the prescription department to the front, if not literally then potentially The swinging doors with the signs "keep out" and "no admittance" must be removed The department itself must show a rigid regard for cleanliness This done, you can consider the desirability of the open display prescription department Remove a section of the separating partition or show case Replace it with a glass partition or leave it open In fact we might even consider actually bringing your prescription department to the front so it will at least partly occupy the front window What better advertising appeal can you offer the transient public! Our bid for favorable attention is two-sided—one to the professional men who will write prescriptions to be sent to our store, the other is the public for whom these prescriptions are written To turn prospects to customers we must first find, then sell the prospects We aim to turn the window shopper to an active customer Consider then the open display prescription department and its desirability in the window

A studied plan of window displays is very good advertising It is not enough to cooperate with the splendid idea of Pharmacy Week Why not consider one week per month, rather than one week a year, always with a tie-up in the store on the show-cases

Of course our new program considers the elimination of questionable store practices Your patrons may shop for prices but don't you shop for business Name your price and hold to it Counter prescribing is of course absolutely taboo

Carry enough stock to have a workable assortment Put in a library of suitable pharmaceutical reference books and include books on materia medica and applied therapeutics and some trade and medical journals to encourage reference by your doctors

Now you have the atmosphere into which you can invite any doctor or customer Without this background your professional contacts will fall flat Now you can really qualify as a prescription specialist The next move is to determine your

* Section on Commercial Interests A PH A Washington meeting 1934

operative area You decide just how much territory you intend to cover, using your store as a center

You then make a card index of every last prospect in that area Your first call will eliminate many of them as undesirable Your object is an active call list of the cream of the entire list This card index will carry the accurate spelling of the name, address and hospital connection of every prospect It will show the office hours, day-off and specialty practiced and allow for columns to indicate the dates of calls and repeat calls, with enough space to record notes of interest, prod uct detailed, whether sample or circular was left and most of it in code so that if lost or stolen the cards will represent little if any value to the finder

Now comes the problem of time-finding We are considering nothing but the personal call as having many times the business building value of letters or phone calls

It is easily agreed that while we pay salaries by the week we are actually get ting more value per dollar of salary in the busy hours than the quiet hours We pay the same for the peak load hour as for the valley performance The object is to raise the valley hour values Therefore, we spot those hours and adjust them to the office hours of our prospects as shown by our card index One can easily reach any doctor within five blocks of the store in five minutes Allowing twenty minutes for the interview, that permits of two professional contacts per hour Sup pose you have only one hour per day, the question arises as to repeat calls Sub-ject to variations, two months is too distant and one month too frequent Assum ing that six weeks is reasonable for repeats, and using only five days a week, you are thereby easily scheduled for sixty doctors every six weeks This is just about sixty more than are regularly contacted right now If your call list, after weeding out the undesirables, is thirty or ninety, it is easy to adjust your schedule

Our next problem is what to detail First we would mention your own name goods, a formula of your own, either complete and perfected, or incomplete, as for instance a vehicle or cough syrup base, ointment base or some such product as a tooth paste base This suggests the growing value of the dental profession and the desirability of including the dentists in your operative area for your card index record One advantage in calling on dentists is the fact of all-day office hours as compared with the relatively few hours available for physicians Also one must recognize that dental colleges are not teaching prescription writing, neither the science thereof nor the economic principles involved

Getting back to the subject of what products to detail we would first caution against talking about too many products Four or five are too many Remember the twenty-minute limit to guarantee a welcome on your next call and you had better stick to one product Do not be too scientific, your doctor is a practical man and wants facts He wants to know the name of the product, its uses, indi cations, solubility, toxicity (if any), dosage and contraindications Omit the chemi-cal structure and pharmaceutical details

Pick your additional products from the U S P and the N F , also the N N R and the R B of the AMERICAN PHARMACEUTICAL ASSOCIATION These will give you all the material you will ever want considering one product (or even two) per call and eight calls per year

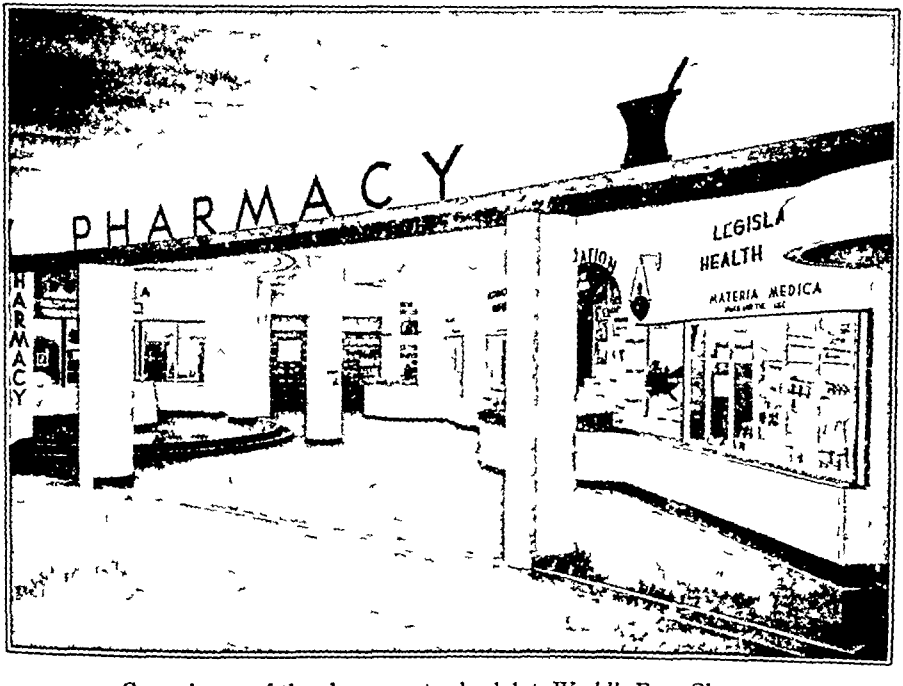
A word on team-work with the detail men of the many manufacturing phar-

maceutical houses They are here to stay and their acquaintance had better be cultivated They are asking you to fill the prescriptions they create You should expect them to cooperate with you They should give you the same presentation they give their doctors and a full list of all doctors detailed in your operative area Then, if you follow up on that list by personal call you are in line for twice the returns from half the effort—half your time expense Let those doctors know that you have that particular product in stock and want his prescriptions

Here is an idea that might be tried Go through the advertising in the medical journal either national or state most widely read by your doctors Pick out the products you have in stock and use them for a professional window display Use a sign calling attention to the name and date of the journal used Tell your doctors about your window

Finally the "thank you" letter Go through your files and list the doctors whose prescriptions you have filled in the last month Send them a letter of thanks and a request for more or continued business Vary the wording but systematically capitalize on the idea as you systematically work your call list

We are confident that based on the principles of action above outlined any professionally minded pharmacist can put on an effective business building program that will pay good dividends in continued good business



General view of the pharmaceutical exhibit, World's Fair, Chicago

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note With the placing of pharmacy upon a collegiate basis the pharmacist is in position to meet professional men on their own ground Pharmacy and medicine must work hand in hand if the public health is to be conserved, and such coöperation cannot be secured or maintained unless the pharmacist is willing to meet the physician on a professional basis and discuss their mutual problems In fact, it seems to me that it is incumbent upon the pharmacist to cultivate the acquaintance of the physicians whose prescriptions he is compounding and to discuss with them any difficulty involved The following paper by Dr L Wait Rising contains good ideas on how to teach students to approach physicians If the student has the proper profes sional attitude the proper cultural background the necessary self confidence and the natural desire to cooperate with his physicians it would seem, at least to your Editor, that he would be able to make the proper approach without being taught any special methods I agree with Professor Rising that every student should be thoroughly awake to the importance of this professional contact and cooperation —C B JORDAN, *Editor*

TEACHING STUDENTS HOW TO APPROACH PHYSICIANS

BY L WAIT RISING

Pharmacy is to-day making its greatest bid for the friendship and cooperation of the medical profession Better professional relationships between the two callings are being stressed with increasing vigor

The colleges of pharmacy are turned to as organizations which should have a large part in this movement Their task is primarily to equip the men responsible for these improved relationships, not only with a thorough knowledge of pharmacy but with an understanding of the personal equation problems incident to the inter locking of the two professions It is not enough that our schools should graduate men and women who, to use a not too elegant expression, "know their pharmacy" The mere possession of fundamental pharmaceutical knowledges does not grant any special ability to use that information advantageously in contacts with medical men Since these contacts are keystones in the structure of improved relationships, the value of any effort made by the colleges to aid in unlocking this knowledge and making easier its expression is obvious It is just as necessary and essential to train men in the verbal expression of their skill as it is to develop dexterity in the laboratory A few students have been blessed by nature with the faculty of logical exposition, so that after acquiring a thorough knowledge of their field they need no training in oral expression or human relations to enable them to tactfully and intelligently contact medical colleagues But the mass of students stand in need of at least some direction in the art of making the right sort of professional contacts

Our colleges must not fail in their increased responsibility to the profession by neglecting this added phase of instruction at a time when it is most needed That they have not measured up in the past is evidenced by the fact that when it becomes necessary for the druggist to call a physician about an error in a prescription, he all too frequently makes a hasty grab for the telephone and shouts into the doctor's ear, "You made a mistake in Mrs Brown's prescription What shall I do about it?" Or when he resolves to do some detailing he finds on entering the physician's

office that he does not know how to say what is on his mind The result is a lame and somewhat stereotyped "Doctor, we specialize in prescriptions Only the best ingredients are used We will call for prescriptions and deliver medicines promptly Come down and look over our prescription department Good-bye" These conversations are perhaps a trifle overdrawn, but they serve to illustrate the definite inability of the average pharmacist to express himself orally under certain circumstances He feels this deficiency, loses confidence in his ability to cope with such situations and builds up an inferiority complex with respect to all medical men

Some of our schools are making determined efforts to instruct the student in the art of verbal professional relations with the hope of eradicating this condition, but the movement is not sufficiently widespread to do a great amount of good It is the purpose of this paper, therefore, to once again call attention to this lack of ability on the part of our pharmacists and to the concomitant lack of initiative on the part of the schools of pharmacy in remedying the condition

Let us consider what might be done by the colleges to make telephone conversations a normal part of pharmaceutical technique They should be studied just as are any other subjects with which the student is not familiar The professor of dispensing pharmacy should handle this work and he might well begin it with a detailed analysis of professional calls By so doing he could satisfactorily impress his students with certain salient facts about this type of contact which, if thoroughly comprehended, would go a long way toward preventing misunderstandings between physicians and pharmacists

Let the analysis start with a consideration of the reason for the call The student probably already knows that in the majority of cases where the pharmacist finds it necessary to call a physician, the reason centers in that physician's prescription What he probably does not know, or at least does not fully realize, is that this call is basically a criticism of the physician, and further that, no matter how merited, unless diplomatically and tactfully stated it will not be pleasantly received If the approach is wrong, the writer of the prescription infers that he is somehow being placed on the defensive, and he immediately rises to the occasion with a typical defensive mental attitude, a sort of "I'll show you who is right" feeling Considerable palliative explanation then becomes necessary if the conversation is to accomplish the desired result

The professor can well point out here the serious consequences frequently resulting from a few colloquies bungled for this reason After a conversation has taken the trend indicated above, the physician's response is often such as to make the pharmacist feel that he is the one who is in the wrong and that he is unjustly being made the target for caustic comment Therefore many pharmacists prefer to guess at the intent of the prescriber or to alter the prescription in a fashion far beyond their authority rather than run the risk of another unpleasant encounter with the doctor Such procedure is manifestly unfair to the patient and the physician, and is a very poor advertisement for pharmacy The student is thus made aware through this method of approach that each occasion for calling a physician regarding a prescription is usually a necessary criticism, that unless properly introduced the criticism antagonizes, and that this antagonism frequently results in subsequent unethical handling of prescriptions

Now is the time to stress a revision of the proverb, "A soft answer turneth away wrath," which changed might read, "A soft suggestion bringeth ready acquiescence" In other words, a nicely turned, discriminating opening of the conversation will avoid all misunderstandings, will put the doctor in a receptive frame of mind, and will pave the way for a mutually agreeable conclusion to the affair

One of the major contributors to this satisfactory opening is a complete understanding of the point or points of difficulty in the prescription The vital necessity of being thoroughly sure of his ground before making any attempt to call the physician should be explained to the student There are certainly enough parallels that can be drawn from the daily recitation problems of a student to quickly convince him that knowledge brings confidence and confidence brings ease of mind with its consequent sureness of expression

In order to satisfactorily develop the opening statements and to facilitate the planning of the subsequent technical portion of the conversation, the student should be taught to ask himself the following questions All difficulties as far as an intelligent, well-spoken explanation of the topic of conversation is concerned normally will have vanished as the direct result

The first question is Precisely why is it necessary to call the doctor? This gets the difficulty so clearly fixed in the mind that explaining it becomes easy The diagnosis made, a treatment is indicated, hence Question two What means are available for remedying the condition? The answer to this question not only sets forth the possible solutions of the difficulty but should also suggest which will be the most suitable Question three Are the reasons for the suggestions to be made to the doctor valid, and can they be stated in a few words? The first part of Question three is a check on those who are prone to jump at conclusions Such people need something that will make them pause and reflect Many times what seems to be the obvious chemical or physical trouble in a prescription is in nowise responsible An examination into the validity of the arguments would avoid such error in judgment The last half of Question three is to prevent rambling after the conversation has begun For obvious reasons, the physician appreciates a simple, concise statement of the difficulty and its solution Question four Precisely what is the opening statement to be? This is perhaps where the greatest amount of tact is required, for the opening statement creates the first impression The value of that impression in gaining the respect and the willing cooperation of the physician has already been seen

Basically the same preparation is required for personal visitation work or other types of physician-pharmacist conversations in which the latter is endeavoring to enlist the aid and cooperation of the former The questions suggested point always to the fundamental structure of any interview of a professional nature They focus the proper attention on the objective, the building up of the case, and the fashion in which it will be executed The result is a well-planned interview, a rarity to-day Physicians cannot help reacting favorably to this new thoughtfulness on the part of the pharmacist Surely this reaction will indicate that the colleges are more than ever living up to their obligations to pharmacy

THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

ABSTRACT OF THE MINUTES OF THE SESSIONS HELD IN WASHINGTON, D C, WEDNESDAY, MAY 9TH, THURSDAY, MAY 10TH, AND FRIDAY, MAY 11TH

The First Session of the Conference of Pharmaceutical Association Secretaries was convened May 9th, at 2 00 P M, by President Robert C Wilson The following responded to roll call W E Bingham, Alabama, Charles Clayton, Colorado, Albert Dougherty, Delaware, Robert Wilson, Georgia, William B Day Illinois, F V McCullough, Indiana, J W Slocum, Iowa, John F McCloskey, Louisiana, Roy C Reese Kansas, Prescott Loveland, New Jersey, George Mathers, New York, J B Pilchard Pennsylvania, James J Gill, Rhode Island, J M Plaxco, South Carolina, Walter Adams, Texas, A L I Winne, Virginia, J Lester Hayman, West Virginia, Ralph W Clark, Wisconsin

The members were requested to stand in silence in memory of Edgar D Oslin, of Arkansas Due to the absence of Secretary-Treasurer Carl G A Harring Roy C Reese was elected temporary Secretary The report of Secretary-Treasurer Carl G A Harring was read and accepted with thanks It follows

REPORT OF THE SECRETARY

BY CARL G A HARRING

Fellow Secretaries

The pleasant task of maintaining contact between the members of our Guild has been mine for another year, and although the responses to my efforts have not, at times, been as enthusiastic as I had hoped they might be, the fact remains that we are still acting in unison and with more interest than previously At our last conference in Madison, I was charged with the duty of preparing and mailing questionnaires upon topics of the day, every quarter—this duty I have tried to fulfil but owing to the fact that the time between meetings has been contracted by three months, only two questionnaires were sent out The replies to these questionnaires were not as numerous as your secretary had dared to hope, while questions of vital importance were discussed, the universal interest that we had hoped to create was still missing

If we could lay down a course of action to be followed by all secretaries, if we could induce each and every one of them to participate in this work, and impress upon our state associations that this work is going forward and must be the rallying point for those who have the good of pharmacy at heart, then we would be doing something, and starting the ball rolling in the right direction Too many secretaries are so occupied with their own affairs that the affairs of the state association must suffer, hence, when national associations endeavor to organize some concerted movement they are handicapped by the lack of practical working contacts

If every state association had a competent individual as its secretary and paid him a salary that would allow him to give all his time to the association and if these secretaries as part of their duty were to keep in contact by short monthly bulletins I feel certain that pharmacy would benefit to an amazing extent It is my sincere hope that during the coming season the questionnaire or bulletin system will voluntarily enlarge even at the sacrifice of some time on the part of secretaries, and that *your* secretary will be kept busy answering questions

The exchange of Pharmaceutical Journals has been of great practical value and your secretary wishes to extend his thanks to those secretaries who are thoughtful enough to send him every number of their publication

It is indeed unfortunate that many secretaries do not find it worth while to affiliate with our Conference Your secretary has taken pains to send all communications to every secretary in the United States, and would have appreciated the courtesy of an acknowledgment It is my firm belief that where a secretary is indifferent to a movement such as this conference, there you will find a state association that shows spasmodic signs of life, but accomplishes very little in the long run

Your secretary would recommend that the questionnaire and bulletin system be continued, in the hope that more interest will be evinced and that more of a spirit of coöperation may be developed There can be no question but that the conference plan is sound—it is up to us as individuals to make it an outstanding success

REPORT OF THE TREASURER

BY CARL G A HARRING

Jan 1, 1933 on hand	$359 46	Jan 15th, Printing minutes	$ 10 66
Received dues from 30 members	150 00	Envelopes and stamps	3 96
		Mimeographing	3 00
	$509 46	Mailing	1 65
Less expenditures	277 57	June 1st, Mimeographing	1 50
		Stamps	2 00
Cash on hand, Dec 31, 1933	$231 89	June 20th, Mimeographing	1 75
		Mailing	1 50
		July 5th Mimeographing	4 50
		Stamps	1 50
		Aug 16th, Mimeographing	3 00
		Aug 24th, Mimeographing	4 75
		Sept 15th, Mimeographing	2 25
		Stamps	2 00
		Donation to Century of Progress	50 00
		Donation to American Institute of Pharmacy	100 00
During 1934, 18 members have paid dues amounting to $90 and about $21 have been expended, which would leave on hand at this time $300		Honorarium to Secretary	50 00
		Oct 15th, JOUR A PH A	25 00
		Nov 1st Stamps	3 30
		Dec 10th Mimeographing	1 75
		Stamps	1 50
		Dec 30th Mimeographing and Mailing	2 00
			$277 57

The address of President Robert C Wilson was read It follows

ABSTRACT OF THE REPORT OF THE CHAIRMAN

BY R C WILSON

Fellow Secretaries

I do not propose to burden you with an extensive address but am using this opportunity simply for a few remarks on some matters in which we are vitally interested I will not attempt a review of the various matters which have transpired during the year, but on the other hand while certain of these events are fresh in our minds I want to discuss one or two of them with you, which may have to do with our future welfare

1 I believe that this Conference should be enlarged in so far as membership is concerned to include all other officers in addition to the secretaries, thus by opening up the membership in this way would be very helpful by increasing the number attending this group and tend to bring together in a more general way the leaders in pharmacy throughout America and would stimulate a much broader interest in the work of this Conference

I, therefore, recommend for your consideration and action, if you deem advisable that the name of this Conference be changed to read "The Conference of State Pharmaceutical Association Officers" and include elected or appointed officials of any or all of our State and Territorial associations

2 American Pharmacy, as I see it has been subject to many calls within the past and sensing that a crisis confronted us, or we thought it did we have responded or attempted to respond to each of these calls, many of which were leading in diverse directions and getting us nowhere Events of the recent past should impress upon us the importance of being able to present a united front particularly in so far as our national objectives are concerned We should be subject to one call which should be promulgated by a properly constituted authority with the ability for real leadership

I would not deny to the AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association of Retail Druggists, the Drug Institute and the National Drug Trade Conference the right to existence so long as their primary objective is for the welfare of pharmacy in America I do feel that if these organizations had given more attention to our State pharmaceutical associations, that their own work might have proven more worth while and our own State association's work would have been cemented one with another on a much firmer basis

We are not only subject to calls from these national organizations but also from various minor groups as well as individuals who, independent of all other groups, are also seeking to establish themselves as leaders This is not as it should be Unless and until some sort of a plan for the unification and centralization of our efforts and objectives is found American Pharmacy will continue to flounder as in the past, present conditions are the result

We have seen our State associations ignored at times by our National associations, they come into our States for organization purposes frequently without our knowledge or consent, seeking to build up their own organizations without due regard to or consideration for our State associations

Lastly we have seen the organization of District Drug Code Councils without any regard whatever for or relationship to the State associations What comes next we cannot tell, but unless and until this matter of the invasion of the individual states by any and every organization which may come along, intent upon ignoring the existence of our State associations, is controlled in some way, then there will be no place for our state organizations

I would, therefore, recommend that this Conference adopt some resolution covering the points I have just discussed with the idea of insuring some definite restraint against the possibility of future ignoring of our State pharmaceutical set ups

The address of the President was received and discussion deferred to the Second Session of the Conference, and a committee was appointed to present a report on the address at the Second Session

After further discussion William B Day moved to extend invitations to State associations to be represented by all their officers or as many as could attend F V McCullough moved that the recommendations of President Wilson be considered following the Joint Session with the Section on Education and Legislation It was so ordered

J J Gill reported the illness of Secretary Harring and on motion a telegram was sent to him, expressing sympathy and the hope for his early recovery

Walter D Adams moved that a committee be appointed to draft resolutions and spread them on the minutes on the death of Edgar D Oslin and that a copy of the resolutions be sent to his widow It was so ordered

President Wilson read a telegram of greetings from Secretary Elbert R Weaver of Oklahoma Pharmaceutical Association

Prescott R Loveland moved that an honorarium of fifty dollars be paid Secretary Harring and that the Secretary-Treasurer be authorized to draw a check to that amount payable to himself—carried unanimously

The list of topics for discussion were read It follows

(Instead of repeating the subjects they will be hereafter referred to by number)

1 "Is it desirable if so is it possible to form a National Association from the various State Associations with every member of the State Association automatically a member of the National Association without payment of additional membership dues?

Discussion opened by A L I Winne Secretary, Virginia Pharmaceutical Association

2 ' Is a State Drug Code desirable in addition to the National Code?"

Discussion opened by Prescott R Loveland Secretary, N J Pharmaceutical Association

3 'Since the State Associations have been ignored in the National Drug Code set-up, what should be the attitude of the State Associations to Code matters?"

Discussion opened by J Lester Hayman Secretary West Virginia Pharmaceutical Association

4 'Can a plan be evolved whereby one membership fee can be made to cover State and National Association dues?"

Discussion opened by R A Turrel, Secretary, Michigan State Pharmaceutical Association

5 ' The organization of Congressional Districts or County Units "

Discussion opened by J W Slocum, Secretary, Iowa Pharmaceutical Association

6 'Is the handling of liquor in drug stores under prohibition repeal on a satisfactory basis? What changes or improvements should be made?"

Discussion opened by F V McCullough, Secretary, Indiana Pharmaceutical Association

7 "Is it desirable, if so, is it possible to have this Conference submit to each State association each year some suggestions as to the program with the idea of unifying our efforts toward some definitive objectives, National in scope?"

Discussion opened by W D Adams, Secretary, Texas Pharmaceutical Association

8 "Is there a desirability and a possibility of holding joint meetings of the Pharmaceutical Associations with the State Medical and Dental Associations?"

Discussion opened by E F Kelly, Secretary, Maryland Pharmaceutical Association

9 "What steps can be taken through Association channels to curb the practise of manufacturers packaging 10¢ sizes of proprietary medicines and cosmetics for distribution through department stores?"

Discussion opened by Roy C Reese, Secretary, Kansas Pharmaceutical Association

10 ' To what extent can the professional phases of Pharmacy be made a part of our programs?"

Discussion opened by J G Beard, Secretary North Carolina Pharmaceutical Association

Editor Eberle extended greetings and offered to do whatever he could to help the cause of the Conference

On motion duly seconded the reports of the Secretary and of the Treasurer were accepted with thanks of the Conference

President Wilson stated that the topics for discussion would be taken up A L I Winne presented Topic No 1

Discussion was opened by A L I Winne on the program item entitled, 'Is it desirable, if so, is it possible to form a National Association from the various State Associations with every member of the State Association automatically a member of the National Association without payment of additional membership dues?" Mr Winne reviewed the circumstances which prompted the inclusion of this item on the Conference program, referring to an editorial appearing in the January *Virginia Pharmacist*, and discussed the proposition briefly, presenting the seeming advantages that might accrue from a federation of State Association members and at the same time pointing out the disadvantages and the possible conflict with the several existing national organizations

The chairman then opened the topic for discussion and views were expressed by a number of those present There was naturally a division of opinion and while a considerable number of the secretaries present thought that the plan might be successfully carried out others objected on the grounds of the difficulties to be encountered in the formation of another national organization, and of the possibility of a division of strength rather than the promotion of unity, and of the weakening effects which such an organization might have upon the already existing nation wide associations Those taking part in the discussion were Secretary Reese of Kansas, Secretary Adams of Texas Secretary Wilson of Georgia Secretary Clark of Wisconsin, Secretary McCullough of Indiana Secretary Loveland of New Jersey, Secretary Pilchard of Pennsylvania, Secretary Slocum of Iowa, Secretary Plaxco of South Carolina, Secretary Day of Illinois, Secretary Mather of New York Secretary Hayman of West Virginia and Mr Riemenschneider of Chicago

The discussion did not lead to any formal action but the incoming president was authorized to appoint a committee to give it further study and to empower this committee, under the direction of the President to call a special meeting of the secretaries of the several state associations, at a place to be designated to formulate plans and effect an organization, if deemed advisable

This committee was also authorized to bring to the attention of each state association secretary the outline of the plan and to request that it be presented at the impending annual meeting of each state association for discussion, and for such action as the association desired to take with reference to the proposition (Abstracted by A L I Winne)

Secretary E F Kelly expressed appreciation of the AMERICAN PHARMACEUTICAL ASSOCIATION for the work being done by the Conference and hoped that the relationship with State associations would be closer, for he believed firmly in the value of their coöperation These bodies should meet several times a year and hold longer sessions and for this purpose the American

Institute of Pharmacy presents the opportunity and the ASSOCIATION hopes that these bodies will be one of the strong units of the Headquarters project In Maryland there is a close coöperation of pharmacists with the medical and dental professions

Prescott Loveland referred to the cooperation of the medical, dental and pharmaceutical professions and other related organizations in New Jersey

Roy C Reese referred to these bodies in Kansas with the Public Health Council

President Wilson stated that in Georgia two pharmacists had been named on the State Board of Health

Prescott Loveland introduced Topic No 2 He said *In opening this discussion, I will* state that the week before last, the pharmacists of New Jersey succeeded in getting a State Retail Drug Code The primary reason for desiring a State Code was because the Code Authorities under the Federal set up seemed unable to get action on code violations within a reasonable time

Several months ago there was formed in the New Jersey Pharmaceutical Association the Retail Drug Trade Alliance a wheel within a wheel Dr Fischelis was the Chairman of the Alliance This newly formed body in cooperation with local and county organizations proceeded to prepare a State Retail Drug Code similar to the National Code which, under a law passed and signed by Governor Moore in July of last year, made it possible for a majority of any industry applying for a code to obtain the approval of the Governor for one subject

The services of a lawyer were obtained and Dr Fischelis of the Retail Drug Trade Alliance and representatives from the other organizations patterned a Code of Fair Competition for the Retail Drug Trade of the State of New Jersey A public hearing was called in Newark on April 17th A capacity crowd filled the largest room available in the Industrial Building Deputy State Administrator Tepper was in charge of the meeting and called for statements from proponents and opponents of the code Dr Fischelis led off for the proponents presenting the matter in a very comprehensive way He was followed by several other speakers

The opposition was represented by a woman attorney from New York She stated that her clients bitterly opposed the 21% mark up In response to a question by the Deputy Administrator, she stated that no such mark-up was necessary On being asked who her clients were, she refused to name them, but on Administrator Tepper's statement that he would expunge her remarks from the record, she stated that she would advise him privately who her clients were

The representative of the owners of a chain of cosmetic shops also opposed the 21% mark-up He stated that his firm was making money at the present time and did not need any such mark up A little cross questioning by the Deputy Administrator showed the weakness of his argument

One other opponent was heard, an officer of a department store, who said that his firm was not opposed to the code but was afraid that a 21% mark up in Newark and Jersey City would drive a lot of business across the river to New York City where no such mark up was in operation Administrator Tepper's reply to this was If New York business men want to do business at starvation prices, I don't see why New Jersey merchants should be compelled to do so "

At the conclusion of this hearing we were lead to believe that except for some minor changes the code would receive favorable consideration so that several days later, Dr Fischelis and the other members of the Committee were quite amazed on learning from the State Administrator that the code would be allowed to go through, but with the mark-up eliminated At a meeting of the Board of Trustees of the New Jersey Pharmaceutical Association, the members of the Board were unanimously in favor of notifying the authorities that we did not desire a State Retail Drug Code unless it contained a mark up and after the matter was discussed it was agreed that 15% would be the lowest mark up that would be acceptable, and the State Administrator was so informed

On April 27th another mass meeting was called this time in the Auditorium of the Elks Club, Newark, at which there were present about 1500 pharmacists Governor Moore and the State Administrator Colonel Eisner, and Deputy Administrator Tepper were present In a brief speech, Governor Moore stated that he was glad to be able to assist the pharmacists of New Jersey in making a decent living The next day, Friday he signed the code with the 15% mark up included, which was to take effect the following Monday, but as there was not sufficient time to start the machinery going, the code did not become effective for another week.

The Code Authority was originally intended to consist of 15 druggists and 4 members

representing perfume shops, department stores, etc , and one member, appointed by the Governor, who had no vote At the organization meeting of the Authority, the Drug Clerks Association thought they should have representation, so the Authority was enlarged and now numbers 21 George L Mederer, a retail druggist of Newark, was elected director of the State Retail Drug Code Authority The proposed set-up is, in addition to the director, one assistant director or counsel, 5 regional directors, each with a regional inspector working under him All information and material will be mailed from the Newark office of the Director On Monday of this week, a copy of the code and a list of prices was to have been mailed from the Newark office to every retail drug dealer of record in the state

As I understand it violations are to be brought to the attention of the regional director who will endeavor to induce the erring brother to comply with the code regulations If he fails to do so, the matter is to be referred to the Compliance Director

Secretary Loveland stated that the foregoing was a brief statement regarding the formation of the New Jersey State Retail Drug Code which was signed by Governor Moore on April 28th and which is just now being put into effect (Abstracted by Prescott Loveland)

In reply to F V McCullough and Ralph W Clark, Mr Loveland said that the wages named were $35 per week of sixty hours The Association of Drug Clerks desired seven 8 hour days He stated further that the Code is on probation for sixty days Ralph W Clark referred to several complications of the State code in Wisconsin

Mr Riemenschneider inquired whether the legislation is part of the State Recovery Act, in reply, Mr Loveland said it is

A L I Winne said Virginia had a law which paralleled the Federal Act, violation can be punished under the State law

Ralph W Clark favored concentrating on the Federal code

Prescott Loveland thought most druggists favored the State code

J W Slocum stated that cost must be added in dozen price unless assumed by the manufacturer He inquired whether the 15% mark-up was in addition to the defined cost Mr Loveland replied in the affirmative

President Wilson called upon J Lester Hayman, of West Virginia, to lead the discussion on the next topic— Since the State Associations have been ignored in the National Drug Code set-up, what should be the attitude of the State Associations to code matters?" (No 3)

Mr Hayman in the discussion took the attitude that it was the general opinion of most of the secretaries present that the State Associations had been ignored in Code matters with the exception of having been called upon to help in the organization of the Local Congressional District Code Authorities He called attention to the fact that State Secretaries were called upon by members of the Local Trade Authorities for information and advice and under the present set up such help could not be obtained either from the State Association or the National Code Authority, which resulted in unsatisfactory conditions in many of the districts

He said that it was not the attitude of the State Association toward code matters that was particularly important, since all State Associations wanted to be of as much service as possible, the important question is—What may they do under the circumstances, to be of service to their members?

President Wilson remarked that in answer to questions submitted to him, the National Code Authority replied that "We are busy corresponding with our districts and we haven't got time to talk with State Associations "

Mr Hayman explained the difficulty experienced in calling the meetings for the election of the members of the Local Code Authorities, the delay and difficulties being due entirely to lack of information from the National Authority in regard to whether or not druggists from stores in towns of less than 2500 population were eligible to vote for the members of the Local Trade Authority He thought the Local Trade Authorities, especially in the smaller districts, should be informed as to what they may or may not do under the code, and that at the present time due to lack of official information, are trying to follow rules and regulations of the larger cities, such as New York, Chicago, etc

Charles J Clayton said that he was under the impression that later on the operations of the code would be turned over to the various trade organizations, and that in their state the association

was drafting amendments to their constitution and by-laws so as to put their organization in a position to take care of the change if such was made

Roy C Reese and A L I Winne contributed to the discussion by questions and the relating of similar experiences

President Wilson appointed the Nominating Committee composed of the following Mr Hayman, Mr Winne and Mr Clark

Mr Slocum called attention to the lateness of the hour and the fact that there were several important topics to be discussed Several secretaries expressed themselves as feeling that the Secretaries Conference was not given sufficient time Mr Hayman moved that the session be continued immediately following the Joint Session on Thursday evening The motion was carried

Mr Reese moved for adjournment and the motion carried

The Extra Session of the Conference of Pharmaceutical Association Secretaries was convened May 10, 1934, at 11 15 P M by President R C Wilson

F V McCullough said one thing to be considered was the recommendation of the President that this organization ought not to be confined to secretaries but that all officers of State Associations should belong

Roy C Reese stated that if the membership is limited to not over three officers of any association he would support the recommendation

J Lester Hayman said that he believed it would be better to merely invite the other officers to the meeting next year and that if the response was favorable a change could be made

Prescott Loveland asked if it was the intention to invite all elected officers of a state association and President Wilson replied that he had in mind bringing to the attention of as many people as possible the work of this Conference He said some associations would continue to send only one or two, but some might send three, four or ten and that it would be helpful in distributing the information brought out in the Conference meetings

Roy C Reese believed it would be better to hold the membership down and that more could be accomplished by limiting it to the President Secretary and one other member He expressed the opinion that the Conference would get farther and much more would be accomplished He explained that a large group would consume hours and hours of argument and discussion

J J Gill moved that the membership be limited to the President and Secretary, the motion was seconded by Mr Reese

A L I Winne hoped that this motion would not be defeated He made mention of the fact that he was largely responsible for the organization of the group in St Louis and that at that time he had in mind the getting together of the secretaries who were the most active officers of the State associations He said however, that he wished that he had suggested a Conference of State Association Officials instead of State Association Secretaries He had no objection to having all the officials of the State associations present nor any reason why they should be excluded from the discussions He suggested that the name be changed to a "Conference of State Pharmaceutical Association Officials" and limit a vote to each State as represented in that body

J J Gill thought the membership should be limited to the President and Secretary

J Lester Hayman did not believe it would be a good move to enlarge the membership at this time He pointed out that Secretary Harring was absent on account of illness and that a copy of the by laws was not procurable This being the case it was not definitely known whether change in membership could be made in the by laws at this meeting He pointed out that the same purpose could be obtained by merely inviting the presidents or other officers for next year and if the response was favorable then the membership could be enlarged, he could see no point in doing so without knowing whether or not it was constitutional or without knowing whether or not the other officers would take an active part in the Conferences

After further discussion—in which Messrs Pilchard, McCullough Gill, Winne, Hayman, Reese, Loveland and Wilson participated—the motion of Mr Gill did not prevail

F V McCullough said that President Wilson had the good of the Conference in mind when he made the recommendation and, at first, he thought well of it but that after the discussion he didn't think so well of it He stated that the Conference was interested in organization work, how to make out programs and how to collect dues, how to run the association He thought that the Conference was primarily for secretaries and ought to be kept that way He moved that

the Conference disregard the recommendation of the President, seconded by A L I Winne The motion was carried

J Lester Hayman moved that the Secretary of the Conference be instructed to send a cordial invitation to the presidents of the State Associations to meet with the Conference next year and take part in the deliberations

Rowland Jones seconded the motion and moved to amend it to have the letter suggest to the President the importance of the Secretary attending these conventions, stating some state associations are not sold on the idea of having the Secretary attend The mover accepted the amendment and stated that last year in his address he had suggested that it be a duty of the President of the Conference each year, to so address the President of each State Association The motion was carried

J J Gill thought that the meetings of the Conference should be held a little earlier during the convention, in his opinion they were about as important as anything transacted during the convention As now held, in widely separated sessions, it was almost impossible to bring before the AMERICAN PHARMACEUTICAL ASSOCIATION matters of importance before adjournment

The matter of special business for this session, which was held over at the request of Mr Adams was postponed due to his absence

A motion to adjourn was carried

President Wilson appointed J Lester Hayman and A L I Winne members of the Committee on Nominations (The foregoing report was abstracted by J Lester Hayman of West Virginia)

SECOND SESSION

The Second Session of the Conference of Pharmaceutical Association Secretaries was convened by President Robert C Wilson, May 11th, at 2 00 P M President Wilson called on Walter D Adams to discuss phases of the President's address The first question was disposed of following the presentation of A L I Winne

The second question related to the activities of national associations in securing membership in states without conferring with state associations The question was freely discussed by Messrs Adams, Wilson, Clayton Slocum and others The following motion by President Wilson was adopted

"It is the conviction and the belief of this body that the interests of Pharmacy in America be best served if all national groups will conduct their activities by cooperating with the various State pharmaceutical associations"

Lester J Hayman presented the following resolution

WHEREAS the State pharmaceutical associations have been ignored in the set up and administration of the National Retail Drug Trade Code Authority and

WHEREAS, many of the local trade authorities set up under said code for the enforcement of the provisions seem not to properly understand their authority in many questions concerning the enforcement of the provisions and are not permitted to make interpretations of its provisions, and

WHEREAS, the local Trade authorities turn to State pharmaceutical association secretaries for counsel and advice in many questions concerning the interpretations of the code, as well as to their duties and authority under such code and

WHEREAS, it has been impossible to obtain the proper advice counsel and interpretations from the National Retail Drug Trade Code Authority and

WHEREAS such advice counsel and interpretations have extreme importance in the successful administration and enforcement of the code, therefore be it

Resolved, that the National Retail Drug Trade Code Authority be requested to take immediate steps to properly and promptly interpret the code when called upon to do so by either the local authority or the State pharmaceutical association secretaries

On motion of J Lester Hayman, seconded by Walter D Adams and a vote the resolution was adopted

Walter D Adams requested that he be permitted to prepare the resolution on the death of Edgar D Oslin after returning to his home Permission was granted to Mr Adams, copy of the resolution is to be sent to Mrs Oslin

F V McCullough suggested that steps be taken to have weekly bulletins issued from Washington, during the sessions of Congress advising State associations of legislative matters, brief

resumés of bills introduced That State associations address the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists to take up this matter

A motion to that end was made and carried

Topic 4, owing to the absence of R A Turrell, was not discussed at this time

Discussion on Topic 5 was opened by J W Slocum

He referred to a tri county organization in Iowa seven or eight years ago, this body has been functioning ever since and has been enlarged He attended as State Secretary, various district meetings but there was no great interest until the depression came when County groups were organized and then the druggists began to realize the possibilities The entire ninety-nine counties have been organized

Much good work has been done by Virgil C Smith in securing information which made the druggists conscious of the need of group organization At the monthly meetings items of importance are discussed and Mr Smith has brought much information to them exemplified by charts, for example, the relation of ten cent items sold in department and ten cent stores, proportionately containing more than regular sizes Druggists from adjoining states came to hear Mr Smith

Much enthusiasm was shown at the meeting of the State association Manufacturers were ready to confer and those that supplied filling stations and ten cent stores were told and made to understand the situation—they were shown by examples

Mr Slocum stated that Iowa druggists had discovered for the first time, the power of the retail druggists by getting together in groups the dealing must be fair and reasonable and then a fight made for the right This work cannot be done by a State association but better by smaller groups These groups have their own organizations and study their own problems Secretary Slocum is preparing monthly bulletins to be sent out to the various groups in which questions which are of interest and importance are presented This conforms with the thought of A L I Winne

President Wilson stated that Topic No 9 was in line with the subject discussed by Secretary Slocum and called on Roy C Reese who gave examples of ten cent sizes and the great variety of the products He referred to a meeting for which he had purchased a variety to illustrate his argument Mr Reese gave the relationship of some of these products in ten cent and regular sizes

The presentation made at the Kansas meeting was repeated at the Missouri convention

Mr Reese said that there will now be improvements in many of these matters He referred to an experience in New York City a number of years ago when he made an effort to call on the wholesalers, he found that many self styled wholesalers were only designated as such, or at least mainly so, for receiving wholesaler's discount

A L I Winne offered a motion that the Secretary of the Conference prepare a communication for transmission to the secretaries of the State pharmaceutical associations and bring the subjects to the attention of their respective organizations The wording was stated as follows, "that the Conference of Pharmaceutical Association Secretaries condemns the practice of any manufacturer who supplies medicines in a 10 cent size package to outlets other than drug stores and refuses at the same time to supply such packages to the drug trade at a price the same as that charged to other outlets, provided such manufacturers are selling to the drug trade packages of the same product of a larger size" The resolution was adopted

Mr Winne stated that he would like to have the suggestion go out to the secretaries which will explain to them that if they wish to get up some discussion at their annual meetings they should have a collection of some of these 10 cent samples In his opinion not all pharmacists are aware of the extent to which 10 cent packages are on the market nor do they know of the relation of the regular sizes to the sizes handled in 10 cent and department stores

Mr Reese said that he simply displayed the samples so that all could see for themselves

The next item in the list of topics was No 6 The discussion was opened by F V McCullough who explained the legislation in Indiana and how it applied to the drug stores Mr McCullough was of the opinion that if alcoholic beverages were handled with the same conscientious care as other medicines they could be handled satisfactorily A number of questions were asked relative to the stamps which must be affixed to package goods and whether a physician could write a prescription for blended whisky

He thought that if the prescription simply called for whisky then the official article had to be dispensed, but if a physician wrote for a blended whisky this could be dispensed as such

President Wilson stated that owing to the absence of Secretary Beard Question No 10 would not be discussed, unless some one desired to do so

A L I Winne and Walter D Adams presented the following

'*Resolved*, that the Conference of the Pharmaceutical Secretaries go on record as opposed to the policy of any manufacturer of distributing any of the medicinal products to filling stations, meat markets pool rooms, etc , in any town or county where there is located a retail drug store" The resolution was adopted

President Wilson referred back to Topic No 1 which was discussed at considerable length by A L I Winne and others Mr Winne referred to the address of President Swain of the A PH A to the House of Delegates, in which he spoke of his efforts to secure membership for the ASSOCIATION and that the results were disappointing and discouraging In Mr Winne's opinion the AMERICAN PHARMACEUTICAL ASSOCIATION would have to render a dual service if the object was to largely increase the membership, which might be affected by establishing a publication similar to that published by a number of State associations He referred to the work that the AMERICAN PHARMACEUTICAL ASSOCIATION is constantly doing for retail druggists and very often the value is not fully understood He hoped that the Conference would seriously consider taking up this matter with the AMERICAN PHARMACEUTICAL ASSOCIATION There is not in existence to day any national association of druggists that can lay claim to represent pharmacy in the United States He was of the opinion that the only way to accomplish this was by the cooperation of all states working in an organized way to bring into one group all the members of the various State associations He thought that State associations could increase their membership if they were in position to offer the benefits of both a local and a national tie-up

J B Pilchard was of the opinion that a monthly bulletin concerning national matters and sent to every State secretary each month might solve the question

A L I Winne thought such a bulletin should carry the information relative to the work going on in Washington in a legislative way and other matters in which the druggists all over the country are interested

J B Pilchard thought that instead of a separate journal which would incorporate the information the state publications could be built up by carrying such items to the members

A L I Winne stated that it was necessary for pharmacy to have the support of a sufficiently large number to speak as representative

President Wilson inquired whether a committee could be appointed from the Conference to confer with the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION on this matter

F V McCullough suggested the following resolution

Be it resolved that it is the opinion of the Conference of Pharmaceutical Association Secretaries that federation of State pharmaceutical associations should be formed at an early date and *further resolved* that the matter of such an organization be presented to the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION and to its Executive Committee" The motion was carried

A L I Winne did not want to make a motion but he hoped that when a committee is appointed the president of the Conference be included as a member of it

President Wilson thanked the members for their cooperation and interest

A L I Winne stated that President Wilson had requested him to present a report regarding conflicting dates of Association Meetings in adjoining states He said that consideration had been given but it is a very difficult matter to arrange for these meetings without conflicting at times

J Lester Hayman reported for the Committee on Nominations as follows For *President* F V McCullough of Indiana, *First Vice President* J W Slocum of Iowa, *Second Vice President*, Roy C Reese Kansas, *Secretary-Treasurer* Carl G A Harring of Massachusetts, *Delegate to the House of Delegates* Charles J Clayton Colorado, *Executive Committee*, Robert C Wilson J J Gill and W E Bingham

On motion duly seconded and a vote, W E Bingham was delegated to cast the unanimous vote of the Conference for the nominees At his request he being one of the nominees, J B Pilchard was instructed to cast the vote

The officers elected were then duly installed

President McCullough said that it was his purpose to serve the Conference to the best of his ability and hoped for the support of all the members He stated that soon after his return home he would prepare a bulletin from the notes he had made and send mimeographed copies to the members

A L I Winne asked the President to appoint the committee to confer with the AMERICAN PHARMACEUTICAL ASSOCIATION The following committee was named F V McCullough, J Lester Hayman, A L I Winne and R C Wilson

The motion was made and duly seconded giving a vote of thanks and appreciation to the retiring officers The meeting of the Conference was then adjourned

(Report of the Joint Meeting with the Section on Education and Legislation and Conference of Law Enforcement Officials, will be printed in the same issue with the Minutes of the Law Enforcement Officials)

COMMITTEE REPORTS

REPORT OF COMMITTEE ON PRESCRIPTION TOLERANCES *

BY HUGO H SCHAEFER, CHAIRMAN

The Committee on Prescription Tolerances has now been functioning for two years During the first year no actual data were collected but a general study of the problems involved was made, meetings were held with Dr Campbell Chief of the Bureau of Food and Drug Administration, a news bulletin was prepared and sent out and the entire subject given as much publicity as possible This was done with a view of obtaining sufficient publicity and to arouse enough interest to enable the Committee to obtain a large number of compounded prescriptions of which a study could be made The chairman wishes to thank not only the members of his Committee but also Dr R L Swain, of Baltimore and Mr John M Woodside, of Harrisburg Pennsylvania, for furnishing material and data

The chief factors to be studied in connection with prescription tolerances are as follows

(*a*) Moisture and allowable impurities in chemicals
(*b*) Decomposition and deterioration
(*c*) Unavoidable errors in the weight of the individual powders, pills or capsules
(*d*) Unavoidable losses due to a portion of the prescription ingredients remaining in the mortar or adhering to utensils
(*e*) Unavoidable errors in weighing and measuring

It was realized that not all of these points could be properly considered at one time and the work of the past year was chiefly in connection with making a study of the unavoidable and normal variations in the weights of individual powders and capsules

With this in view a prescription not subject to decomposition or moisture content changes was selected It represented a mixture of powdered charcoal and magnesium oxide Since the work of the Committee members consisted essentially of weighing the contents of the individual powders it was deemed necessary to first determine what losses this weighing operation involved For this purpose 15 grain powders consisting of 10 grains of charcoal and 5 grains of heavy magnesium oxide were prepared by weighing the ingredients directly on a counterbalanced powder paper The latter were then folded and placed in a prescription box This operation was repeated with 10 grains as well as 5 grains of the mixture per powder One set was prepared with ordinary powder papers and another with wax impregnated papers The papers were then unfolded and the contents carefully transferred to a watch glass and weighed The findings were as follows

AVERAGE LOSS PER POWDER

	Plain Paper	Waxed Paper
15 grain powders	0 05 grain	0 16 grain
10 grain powders	0 04 grain	0 14 grain
5 grain powders	0 035 grain	0 13 grain

* Presented before Section on Practical Pharmacy and Dispensing A PH A Washington meeting, 1934

It will be noted that these variations are negligible but, of course, become proportionately greater with the smaller powders While the above are average losses yet all of the 12 powders in any one set varied only very slightly from the mean All in all the losses were considered negligible and not taken into consideration in further powder weight determinations of this particular mixture although, no doubt, the character of the powder may at times increase this error considerably

Some 600 prescriptions of 10 powders each of the previously mentioned charcoal and magnesia mixture were obtained They had been prepared by pharmacists by students, by college instructors and by Board candidates as part of their practical examination In no case were the compounders aware of the fact that the preparation was to be used for any special purpose The contents of each of the powders were accurately weighed The tabulation of the 6000 weights showed many interesting facts

It was found that in a considerable number of prescriptions submitted the total weight of the contents of the 10 powders varied so greatly from the amount prescribed that it became apparent that the variations were due to one or more of the following factors

(*a*) Faulty weights or balances
(*b*) Errors in reading the prescriptions
(*c*) Errors in calculation
(*d*) Loss of powder through gross carelessness

Since this study had as its object the determination of normal and average variations in the division of the powder mixture it became obvious that the introduction of these enumerated errors would only lead to confusion Some 150 prescriptions which varied in total weight more than 10% from that prescribed were omitted from further study and consideration Over 90% of these had been compounded by students and by Board examination candidates

In general the prescriptions compounded by pharmacists varied only very slightly in total weights of contents

The following list shows the total weight of the contents of ten sets of 15 grain powders taken at random

146 5 grs	147 1 grs	154 2 grs	146 2 grs	151 7 grs
143 2 grs	143 8 grs	144 6 grs	148 3 grs	152 1 grs

The following can be taken as a cross section of the total weights of the 10 grain powders

104 5 grs	102 9 grs	99 0 grs	97 4 grs	103 3 grs
98 2 grs	97 6 grs	101 7 grs	102 6 grs	96 7 grs

The 5 grain powders showed the following

49 2 grs	48 7 grs	51 3 grs	52 6 grs	48 3 grs
47 9 grs	52 2 grs	51 9 grs	50 6 grs	49 6 grs

These figures are characteristic of the prescriptions compounded by pharmacists and show a considerable degree of accuracy The average variation in the 15 grain powders is ±0 383 gr per powder for the 10 grain powders ±0 261 gr per powder and for the 5 grain powders ±0 149 gr per powder The interesting point here is that the error becomes smaller as the powders become lighter although the percentage of error is about the same

These figures would indicate that in a mixture of this kind losses due to faulty weighing mixing in a mortar and transferring to powder papers are small when properly conducted Unfortunately, however, this cannot be said of the variations found in the weights of the individual powders It would seem that many physicians prescribe powders in order to be reasonably sure of proper dosage and the findings of this committee would indicate that there is much room for improvement of this phase of prescription compounding

The following is a tabulation of the weights in grains of some of the 15 grain sets of powders taken at random

No										
1	10 6	15 3	13 2	9 5	17 2	16 3	15 2	14 3	16 4	17 0
2	13 7	14 6	15 3	15 0	15 4	14 1	13 9	14 2	15 6	16 2
3	13 5	16 1	15 9	14 8	15 1	13 9	16 2	14 9	13 9	14 2

4	18 6	16 3	12 2	16 5	17 2	11 6	14 1	13 9	12 8	15 0
5	16 5	16 1	15 0	14 9	13 9	16 5	15 1	14 8	14 7	15 2
6	14 6	14 9	15 2	15 9	13 9	16 0	15 3	14 6	14 1	15 1
7	11 2	11 9	17 2	15 8	16 9	18 0	12 2	10 9	14 2	17 2
8	12 6	14 3	15 9	12 1	14 9	16 2	17 0	14 9	15 2	16 0
9	13 8	14 2	14 1	16 3	16 1	14 8	15 2	15 7	14 9	16 2
10	10 6	17 8	17 2	16 9	12 3	13 4	16 8	16 5	15 1	17 3
11	19 7	16 3	14 2	17 6	11 2	13 8	14 2	16 5	15 3	16 5
12	14 6	14 0	13 9	16 2	16 3	15 2	15 7	15 6	14 9	16 1
13	14 3	14 9	16 1	14 7	15 3	15 6	15 1	15 4	19 9	16 3
14	15 2	15 0	14 6	14 9	14 1	16 1	13 9	15 5	14 2	16 2
15	18 2	17 3	14 3	15 7	12 1	11 0	10 9	17 2	15 4	15 1
16	17 6	15 2	14 3	13 2	12 6	18 0	17 1	12 2	15 4	17 2
17	14 3	13 9	15 1	16 2	15 3	15 9	16 1	14 0	15 2	13 8
18	14 1	15 9	15 2	15 0	16 0	15 5	13 9	14 1	14 3	15 2

These represent a good cross section of the 180 sets examined The complete tabulation would be entirely too long and serve no good purpose at this time This complete tabulation, however shows that 53 3% of the sets consisted of powders which varied by less than ±1 5 grains from the theoretical 15 grains 72 2% of the sets were made up of powders which varied less than ±2 25 grains 83 8% of the sets were made up of powders which varied less than ±3 grains

The 10 grain powders showed the following cross section

No.										
1	9 2	8 0	12 0	10 2	10 9	7 6	11 9	11 9	8 1	10 3
2	12 2	10 6	10 1	11 9	8 6	8 7	9 2	10 3	9 6	8 6
3	9 2	9 6	10 4	10 6	9 1	11 0	9 7	9 1	10 7	9 9
4	9 7	10 2	10 6	9 3	10 2	10 3	9 2	10 1	9 7	9 2
5	10 3	10 6	10 7	9 2	9 1	9 7	10 8	10 6	9 4	9 7
6	7 3	8 9	13 6	13 9	7 9	10 4	10 9	12 2	12 1	7 4
7	8 1	11 7	11 3	8 9	9 1	10 8	11 7	11 9	8 8	8 2
8	8 4	8 9	11 7	10 2	11 6	9 8	10 1	8 8	11 2	10 2
9	10 6	10 5	9 5	9 8	9 9	10 2	10 0	10 9	9 1	10 7
10	9 7	10 0	10 1	10 5	9 6	9 8	9 6	9 2	10 7	10 2
11	7 9	7 4	6 9	14 2	8 9	10 6	10 1	7 8	9 2	14 5
12	8 7	7 9	12 1	12 3	10 8	10 7	9 2	9 9	10 2	10 8
13	10 6	10 1	9 8	9 2	9 5	10 6	10 1	10 0	9 9	10 4
14	10 5	10 2	10 3	10 1	10 0	9 1	9 2	9 4	9 4	9 2
15	10 4	11 0	9 9	9 7	9 5	10 3	10 2	10 0	9 7	9 1
16	7 2	8 4	12 3	10 6	10 2	10 1	11 9	11 8	9 6	9 9

The entire tabulation of 160 sets of 10 grain powders showed that 50 6% of the sets consisted of powders which varied by less than ±1 grain from the theoretical 10 grains 69 4% varied less than ±1 5 grains and 82 5% varied less than ±2 grains

The following will show the weight of the 5 grain powders

No										
1	4 7	4 9	5 2	5 1	5 3	5 4	4 9	4 7	4 6	4 8
2	4 1	4 3	5 7	5 2	5 6	5 7	5 9	4 3	4 7	4 1
3	4 9	4 6	5 3	5 4	5 0	4 5	4 7	4 8	5 1	4 5
4	4 0	5 7	5 9	6 1	3 9	4 2	4 9	5 8	4 1	3 9
5	3 8	7 1	7 0	4 1	4 3	4 6	4 2	4 7	5 1	5 5
6	7 0	6 9	3 9	4 7	4 6	5 2	5 4	4 7	4 9	4 6
7	4 7	5 2	5 3	4 6	4 5	5 4	5 4	5 2	4 9	4 6
8	4 6	4 8	4 7	4 9	5 2	5 5	5 0	5 1	4 7	4 5
9	4 7	4 6	5 2	5 3	5 4	5 0	4 7	4 9	4 8	5 3
10	5 1	5 7	5 4	5 2	4 6	4 6	4 9	4 5	4 7	4 7

No										
11	3 9	4 2	7 2	6 5	5 4	5 1	4 0	4 7	4 6	4 9
12	4 1	4 7	4 6	4 9	4 3	5 4	5 5	5 2	5 3	5 0
13	6 2	6 4	6 3	4 1	4 5	4 2	4 3	5 1	5 0	5 5
14	4 2	4 8	4 9	4 7	5 3	5 8	5 9	5 2	5 0	5 9

A total of 140 sets of 5 grain powders were tabulated as to their individual weights and showed that 50% varied by less than ±0 5 grains 70 7% varied by less than ±0 75 grains and 80 7% by less than ±1 0 grain

An abstract of all of the preceding findings would show the following

Number of powder prescriptions studied 600 (10 powders each)

Number eliminated because of excessive variation in gross weight 150 or 25%

	% of Sets within ±10% Variation	% of Sets within ±15% Variation	% of Sets within ±20% Variation
15 grain powders	53 3	72 2	83 8
10 grain powders	50 6	69 4	82 5
5 grain powders	50 0	70 7	80 7

It would seem therefore, that in ordinary powder prescription compounding there is little difference in the degree of accuracy obtained with powders of different weights It would also seem that there is considerable room for a greater degree of accuracy than that commonly practiced in the division of the powder mixture

No data were obtained as to the exact method by which the powders had been divided in the compounding of these prescriptions Probably most of them were divided by the "eye" method and not weighed individually as that seems to be the general practice In this connection it was reported by a member of this Committee that as much as a 1-grain variation was found in the weights of the powder papers in a box of 500 (No 40) papers examined This would indicate that if the powders are weighed individually it should be done by use of a counterbalanced watch glass and not by weighing with or on the paper Your chairman has found that a group of advanced pharmacy students when told in advance that the contents of the papers would be weighed could prepare 5-, 10- and 15 grain powders all within a ±10% variation by the eye" method A variation of 1 grain in the weights of the empty powder papers would prevent this degree of accuracy particularly in the lighter mixtures when made by weighing the individual powders on the papers It seems reasonable to suppose that the prescription pharmacist could use the same degree of skill in his ordinary work

CONCLUSIONS ON POWDER PRESCRIPTIONS

That in a prescription of this general nature the gross weight of the powders should not vary more than ±5% from the theoretical weight

That in the division of the powders the ' eye" method is satisfactory

That the variations in the weights of the individual powders should not exceed ±10% from the gross weight divided by the number of powders in the prescription

VARIATIONS IN CAPSULE PRESCRIPTIONS

A study was begun by our Committee of normal variations in the weights of capsule contents This study is far from complete and may therefore be considered in the nature of a preliminary report

Since the usual practice of pharmacists in filling capsule prescriptions is to weigh each filled capsule and using as a counterbalance an empty capsule it was thought important to determine variations in the weights of empty capsules with the following findings

	Number Weighed	Average Wt per Capsule	Wt of Lightest Capsule	Wt of Heaviest Capsule	Average ± Variation from Mean Capsule Wt
No 0 capsule	200	0 1084 Gm	0 0892 Gm	0 1262 Gm	11 9%
No 1 capsule	200	0 08809 Gm	0 0798 Gm	0 1012 Gm	9 2%
No 4 capsule	200	0 03740 Gm	0 0310 Gm	0 0411 Gm	8 1%

These figures prove that the variations in the weights of the empty capsules themselves are so great as to preclude a degree of accuracy comparable with the results obtained in the preceding study of the powder weights The average empty capsule weight varies about 10% from the average weight of a large number A few capsule prescriptions were obtained and the contents of the individual capsules weighed While the number of determinations were not considered large enough to allow of any final conclusions yet the following tabulation will give some insight as to what may be expected The same charcoal and magnesia mixture employed in the powder investigation was again used and 50 weights of each size were determined

5 Grain Capsules (5 Sets of 10 Capsules Each)

Gross weight of sets in grains	46 2	44 3	47 2	42 1	45 6

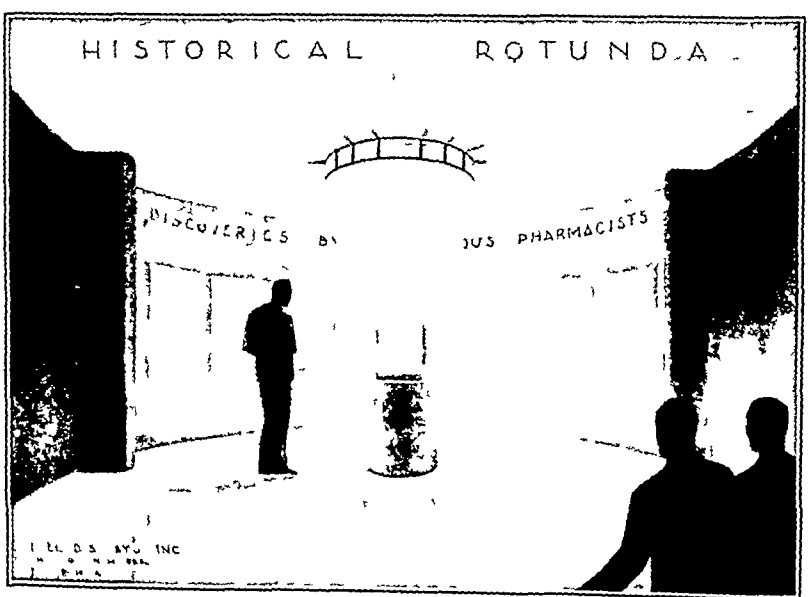
Average ± variation—14 2%
Highest individual capsule content—5 62 grains
Lowest individual capsule content—3 15 grains

3 Grain Capsules (5 Sets of 10 Capsules Each)

Gross weights of sets in grains	26 5	24 6	23 2	27 8	26 3

Average ± variation—16 3%
Highest individual capsule content—3 23 grains
Lowest individual capsule content—1 9 grains

A study of the tabulation made shows that in any single set the contents of the individual capsules run as a rule fairly constant for seven or eight capsules and then there are several which run far under or over weight This of course can be explained by the fact that the compounder filled the first capsules fairly uniformly but found toward the end that there was either too much or too little powder left for the last few capsules Further determinations and more study must however, be given to capsule compounding



The Historical Rotunda tells the story of discoveries, and spaces are assigned to portraits of famous pharmacists, the American Pharmacy Building is featured In order to interest the public a portion of Ebers Papyrus is shown of the World's oldest prescription

ASSOCIATION BUSINESS

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION 1934–1935

Office of the Secretary, 2215 Constitution Ave , Washington, D C

LETTER NO 2

July 19, 1934

To the Members of the Council

The following Council business is submitted to the Council for approval It includes the minutes of the organization meeting of the Council on May 11th, and the minutes of the Executive Committee meeting on July 17th

For the benefit of the new members of the Council it is pointed out that motions made by mail in the interim between meetings of the Council require no second

(*Motion No 1*) *It is moved by Kelly that the minutes of the First Meeting of the Council 1934–1935 as presented in Council Letter No 1, May* JOURNAL, *page 515, be approved*

20 Appointment of Executive Committee and Call of Meeting Pursuant to Item 12 Coun cil Letter No 1 Chairman Hilton, on July 10th announced the appointment of the following Executive Committee of the Council and called a meeting of the Committee for Tuesday July 17th, at the American Institute of Pharmacy at 10 00 A M (E S T) Robert P Fischelis H A B Dunning, A G DuMez, C H LaWall, C W Holton H V Arny, W Bruce Philip, E G Eberle, S L Hilton and E F Kelly

21 Meeting of the Executive Committee Upon call of Chairman Hilton, a meeting of the Executive Committee of the Council was held at 2215 Constitution Avenue, Washington, D C , on July 17th The minutes of the meeting are as follows

"The meeting was called to order by Chairman Hilton at 10 15 A M , with all members pres ent A message from former President Swain was read expressing regrets that he was prevented by a previous engagement from accepting the invitation to attend

"President Fischelis called attention to what he considered errors or discrepancies in the printed minutes of the reorganization meeting and, in connection with Item 19 in Council Letter No 1 to the fact that he had submitted a motion that the unfinished business of the Council and such new business as might come before it be considered at a meeting of the Council or of the Executive Committee to be called by the chairman

"After a general discussion of the proceedings and minutes of the first meeting of the Council it was moved by Fischelis that a committee of three be appointed to formulate a motion to be presented to the Council to approve the proceedings This motion was amended to read that the committee consist of the president, the chairman of the Council and the secretary The motion was seconded by Arny and carried

Dr Dunning chairman of the Committee on Maintenance, then discussed in detail his plans for securing a maintenance fund and plans for the utilization of the building as well as plans for additions to the building and equipment A general discussion followed in which details of the future plans of the ASSOCIATION in connection with the American Institute of Pharmacy were given careful consideration

'At 2 00 P M the meeting adjourned for lunch

' The meeting was called to order by Chairman Hilton at 3 00 P M

'The special committee provided for during the morning session reported that corrections in Items 1 and 12, Council Letter No 1 had been agreed to as well as the opening paragraph of Letter 2 and the motion to approve the proceedings The report was accepted on motion of LaWall seconded by Arny and carried

The recommendation from the Scientific Section that Chapter IX, Article VIII of the By-Laws of the section, be amended to read as follows

> 'All papers, which shall be in duplicate and reports presented to the Section become the property of the ASSOCIATION one copy of the papers and of the reports shall be forwarded to the Editor of the JOURNAL immediately following the annual

meeting of the Section, the other copy of the papers shall be submitted to the chairman of the Committee on Ebert Prize by the secretary of the Section"

was approved on motion of LaWall, seconded by Arny and carried

"It was moved by DuMez that all papers presented before the sections be submitted in duplicate and that the secretary so advise the chairmen of the sections The motion was seconded by LaWall and carried

'The following communication from the Section on Practical Pharmacy and Dispensing was read

"To the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION

"The Section on Practical Pharmacy and Dispensing at their Second Session held Friday afternoon, May 11th, passed the following resolution

'It is recommended that the Section on Practical Pharmacy and Dispensing request the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION to appropriate an additional $50 for our Section This additional $50 to be used in collecting and correlating propaganda that has been used in the various cities, counties and states in this country for promoting professional pharmacy This propaganda will include work such as that of the Interprofessional Relationship Committees U S P and N F Publicity Committees, and Hospital Formularies The purpose of this information is not for the AMERICAN PHARMACEUTICAL ASSOCIATION to carry on an expensive publicity campaign but to collect data which will act as a guide for the various city, county and state associations that are interested in work of this nature

'We further suggest that inasmuch as the Section on Education and Legislation has considered a somewhat similar undertaking it be invited to participate in a cooperative plan whereby its efforts will be devoted to the collection of dental propaganda and the efforts of this section to the medical and all other propaganda

"It is further suggested that this body go on record to the effect that the section's funds which might be appropriated for such work be disbursed only in the collection of the desired information

"In accordance with the By-Laws of our Section we therefore request that the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION appropriate the additional $50 to carry out this project

Respectfully submitted
MARVIN J ANDREWS, *Chairman*
L WAIT RISING, *Delegate to the House of Delegates*"

On motion of Philip, seconded by Holton and carried, the requested appropriation was added to the budget for 1934

"The following report was read

"The American Council on Pharmaceutical Education has not yet begun to function, except to act upon some matters referred to it by its constituent organizations and to lay the ground work for the future development of the main project The reasons for this are two in number, namely, there was a lack of funds with which to meet the budget agreed upon last year (at the Madison Wisconsin, meeting held on August 27, 1933) and conditions prevalent in the field of education during the preceding year were so bad that it was believed it would be unwise to intrude a new factor at this time The financial situation now seems to be clearing, and it is our intention to go ahead with the work as rapidly as possible during the coming year

'Our plans call for the immediate request of an appropriation of $200 from each of the associations represented on the Council which will give a total of $600 to work with This will be used largely to defray the expenses of cutting stencils and sending out letters to secure comments and criticisms of the plan for the standardization of schools submitted by Dean Leigh of Florida two years ago, and which we agreed to use as the basis for the beginning of our studies It is intended to send out copies of these standards to a selected number of outstanding educators with the request that they criticize and comment on them also to the AMERICAN PHARMACEUTICAL ASSOCIATION, the Secretaries of the State Boards of Pharmacy, the Deans of the Colleges of Pharmacy The latter will be requested to submit them to the members of their faculties so that the

viewpoint of the teacher may be obtained as well as that of the administrator and law enforcement official As these comments are received they will be classified and studied with a view to molding them into a composite whole which will be both idealistic and practical in character

"With regard to the matters referred to the Council by the constituent organizations the following report is made

'With respect to the question submitted by the chairman of the Executive Committee of the American Association of Colleges of Pharmacy, What advanced credit shall be given for work done in non-pharmaceutical and non-member colleges?' it is recommended that only such credits be accepted as are approved for the fulfilment of the requirements of a Baccalaureate Degree by a recognized standardizing educational body, the State Department of Education or the State University of the State in which the respective college is located

"The Council still has under advisement the matter of undertaking a study of practical experience which was also referred to it by the American Association of Colleges of Pharmacy Much thought has been given to this subject and it has been discussed at considerable length The consensus of opinion of the members of the Council is that the work involved in making the investigations required would be as great if not greater at this time than that of formulating standards for the colleges and that it is unreasonable to expect the Council to undertake both tasks at the same time

Respectfully submitted,

A G DuMez, *Secretary*"

The report was received and the requested appropriation was added to the budget for 1934, on motion of LaWall seconded by Holton and carried

'The following communication was read

"At the annual meeting of the American Association of Colleges of Pharmacy held in Washington last month the following recommendation was adopted 'That, inasmuch as all drug commodities are primarily health concerns, the American Association of Colleges of Pharmacy goes on record as urging that the manufacture, jobbing and retailing of these commodities be under the direct control of properly qualified pharmacists, and further that our action be broadcast to all organizations represented in the National Drug Trade Conference and that we ask their support as a public health measure"

The recommendation was endorsed on motion of LaWall seconded by Philip and carried

'The secretary advised that an official invitation to the members of the Council to attend the annual joint meeting with the members of the Executive Committee of the N A R D during the coming convention of that Association in New Orleans, had been received It was moved by LaWall that the invitation be accepted, that those members of the Council attending the convention be requested to attend the joint meeting and that the secretary be authorized to attend the convention as the official representative of the Association The motion was seconded by Arny and carried

"It was moved by Holton, seconded by Eberle that the loan authorized under Item 18, Council Letter No 1, be increased to *$40 000* The motion was carried

"As the Reading Room of the American Institute of Pharmacy had been equipped in honor of F M Apple, to the extent of funds bequeathed by him, it was moved by LaWall that the Apple Fund amounting to $1607 05 be transferred to the Headquarters Building Fund The motion was seconded by Holton and carried

On motion of Fischelis seconded by LaWall and carried, the Editor of the JOURNAL was authorized to attach a statement to the minutes of the Section on Education and Legislation when printed to the effect that the resolution of the Section in reference to a proposed National Committee on Professional Information did not reach the Committee on Resolutions in time to be acted upon and that it will therefore have to come before the next annual meeting for action

The President was furnished upon his request with certain advice and information with respect to his appointments and stated that he was not prepared to submit the entire list for approval until later

'After a further discussion of the subject it was moved by Fischelis that each member of the Council be requested to submit in written form, his ideas for the activities to be undertaken in

the American Institute of Pharmacy in addition to those already announced and that a digest of the suggestions received, be submitted to the members of the Council for comment The motion was seconded by Arny and carried

President Fischelis then asked the opinion of those present on the following subjects Proposed merger of the AMERICAN PHARMACEUTICAL ASSOCIATION and National Association of Retail Druggists as advocated by a number of state pharmaceutical associations, proposed federation of state associations and possible affiliation of such federation with the national associations, proposed consolidation of dues of national and state associations, possibility of organizing certain surveys and other activities in the American Institute of Pharmacy if funds are provided from outside sources, status of the American Institute of Pharmacy in relation to the AMERICAN PHARMACEUTICAL ASSOCIATION, proposed plan for a Council of Pharmaceutical Practice as advocated by Professor Cook, study of state codes, study of laws pertaining to the sale of drugs and medicines with the possibility of suggesting a model state law, possibility of enlisting support of the American Bar Association in studies of pharmaceutical legislation, plans for increasing the membership of the ASSOCIATION, better coordination of the programs and activities of sections of the ASSOCIATION and local branches, food and drug legislation, and program for the annual meeting

"A number of these topics were discussed in some detail It was decided to request the special committee of the Council appointed to study the proposed plan for a Council on Pharmaceutical Practice to arrange for a meeting at an early date for the purpose of discussion and making definite recommendations to the Council

'On motion of Arny seconded by DuMez and carried, the meeting adjourned at 8 10 P M"

(*Motion No 2*) *It is moved by Kelly that the minutes of the Executive Committee as presented herewith be approved by the Council and that the actions of the Executive Committee become the actions of the Council*

E F KELLY, *Secretary*

LETTER NO 3

July 31, 1934

To the Members of the Council

22 *Committee on Maintenance* The following communication has been received from President Fischelis

> "In view of the fact that the adoption of Resolution No 1 at the recent annual convention abolishes the previous Committees on Headquarters Campaign Site and Plans, and substitutes for these committees a committee to be known as The American Institute of Pharmacy Maintenance Committee,' I deem it necessary to announce the appointment of this committee without further delay
>
> Resolution No 1 passed at the recent Washington convention specifically states that Dr H A B Dunning be asked to assume the chairmanship of the Maintenance Committee
>
> 'At the meeting of the Executive Committee of the Council held in Washington on July 17th, Mr Dunning agreed to accept the chairmanship, and upon request of the president, suggested the following associates E F Kelly R L Swain S L Hilton and R P Fischelis
>
> "I ask that the Council approve these appointments so that the functioning of this committee will not be delayed in any way"

(*Motion No 3*) *It is moved by Eberle that the Committee on Maintenance as given above be approved*

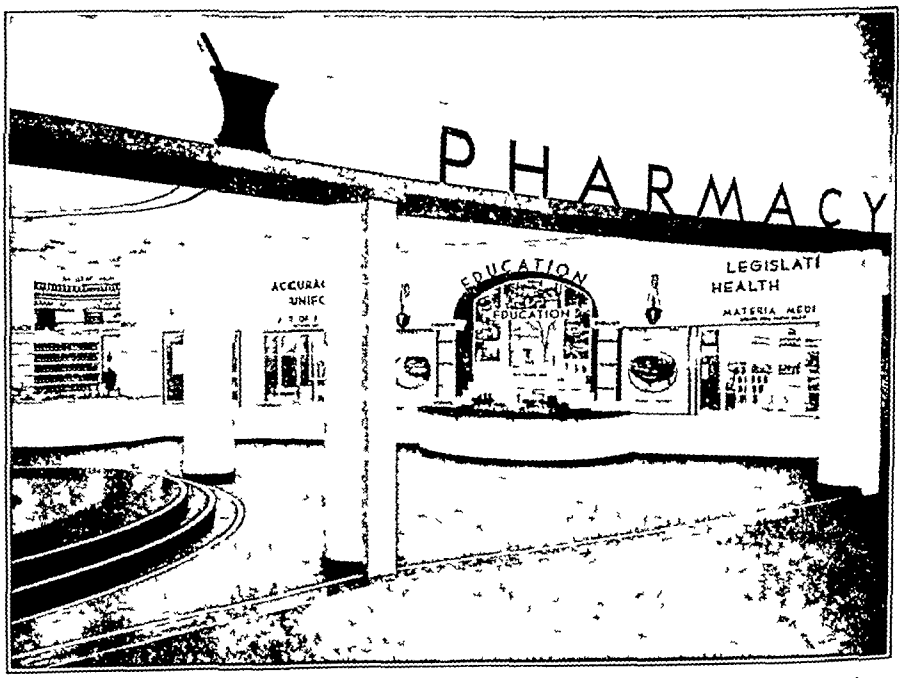
23 *Applicants for Membership* The following applications properly endorsed and accompanied by the first year's dues have been received

No 1 George E Thornton 618 S Washtenaw Ave Chicago, Ill , No 2, Charles Salameno, 100 Prospect St , Paterson N J , No 3, Khau Bunnag, Government Chem Lab , Bangkok Siam, No 4 Edward Krajcik, 695 Madison Avenue, Bridgeport, Conn , No 5 M Joseph Fadgen 1552 Gorsuch Ave Baltimore Md , No 6 Lawrence DeWitt Robertson, Freewater, Oregon, No 7, Earl Mann, c/o Wm Beaumont General Hospital El Paso, Texas, No 8, John J Ilcisin, 1392 Hodgkiss St , Pittsburgh, Pa , No 9, James Burks Harley, 1101 O St , Lincoln, Nebr , No 10, C S Ladd, Box 568, Bismarck, N Dak , No 11, Harry H Harley 1101 O St ,

Lincoln, Nebr , No 12, Attilio Ralph Granito, 95 Main St , Hackensack, N J , No 13, Albert Coco, 546 Morris St , Orange, N J , No 14, Arthur Pfetsch Markendorf, 2201 W Broadway, Louisville, Ky , No 15, J Gilbert Joseph, 1513 Eutaw Place, Baltimore, Md , No 16, Edward Watson Woolard, 134 Garnett, Henderson, N C , No 17, Isidor L Berger, 3835 Fullerton Ave , Chicago, Ill , No 18, Martin M de Long, 5779 E Circle Ave , Chicago, Ill , No 19, Isadore Goldberg, 3014 Georgia Ave , N W , Washington, D C , No 20, Dorothy C McGovern, 736 Irving Ave , Syracuse, N Y , No 21, A Henry Weinstein, 1016 Eye St , N W , Washington, D C , No 22, Joseph Jenkins 3265 Romona Blvd , Los Angeles, Calif , No 23, Carmine R Auricchio, 143 Kingsland Ave , Brooklyn, N Y , No 24 Bernard J Schiller, 4107 Murray Ave , Pittsburgh, Pa , No 25, Everett Henry Behm Mondamin, Iowa, No 26, Benjamin Elkind 2036 Wightman St , Pittsburgh, Pa No 27 Benjamin S Goldstein 224 Norton St , Rochester, N Y , No 28, Sylvia Rapoport, 21 Waumbeck St , Roxbury, Mass , No 29, Angelo P Papulis, 30 Williams St , Chelsea, Mass No 30 Isidor S Tolpin, 418 Boston St Lynn, Mass , No 31, John A MacKenzie, 45 Regent Circle Brookline, Mass , No 32, Phyllis Toon, 33 Howitt Road West Roxbury, Mass , No 33, Elizabeth H Wismer, 83 Congreve St , Roslindale, Mass , No 34 Harry S Bernstein, 139 Chestnut St , Springfield, Mass , No 35 James N Stearns, Y M C A , Madison Ave , Memphis, Tenn , No 36, Russell Edward Brillhart, 885 E Market St , York, Penna , No 37 Lawrence S Stovall, Maupin, Oregon, No 38 Wm E H Schneider, Jr , 90 Engle St , Englewood, N J , No 39 Vernon T E Westervelt, 906 Benjamin Ave , Grand Rapids, Mich , No 40 Gerard Andrew Sormani, 374 Central Ave , Brooklyn, N Y , No 41, Susanne T Biechle, 1431 N Claremont Ave Chicago, Ill

(*Motion No 4*) *Vote on applications for membership in the American Pharmaceutical Association*

E F Kelly, *Secretary*



Detailed view of the west wall of the Pharmacy Exhibit, Chicago World s Fair, the platform at the left is part of the Historical Rotunda

---

EDITORIAL NOTES

A CORRECTION

Throughout the article The Absorption of Calcium," JOUR A PH A, Vol XXIII (1934) 7, 656 "Inosite Hexacalcium Gluconate" should be ' Phosphate "—A R B Jr

THE BRITISH PHARMACEUTICAL SOCIETY'S EDUCATIONAL POLICY

H N Linstead Secretary and Registrar of the British Pharmaceutical Society, whose visit in this country—when the AMERICAN PHARMACEUTICAL ASSOCIATION held its annual meeting in Toronto, 1932—will be remembered by many who made the acquaintance of this well and favorably known pharmacist He discussed the Society s educational policy at a meeting of delegates on July 17th Before introducing his subject, he referred to the principal changes in the examination regulations as follows

1 The dividing of the old botany of the Preliminary Scientific examination into botany and zoology

2 The abolition of chemistry and botany as such from the Pharmaceutical Chemist examination

3 The introduction of physiology as a subject of both the Chemist and Druggist and Pharmaceutical Chemist examinations

4 The reversion to the old system whereby the Chemist and Druggist course becomes the first year of the Pharmaceutical Chemist course

5 The abolition of a period of apprenticeship for the Pharmaceutical Chemist qualification and the substitution of two years' practical experience before or after the examination but before registration

In discussing the need of wider education for pharmacists he presented the question by references and comments to the work which comes within the pharmacist s province

1 It is the function of the pharmacist to furnish the physician with the medicaments he requires,

2 By its charter, the Pharmaceutical Society of Great Britain is expressly charged with the duty of advancing chemistry and pharmacy,"

3 If we do not participate in this work, but leave it to others to perform, we are inevitably going to reduce ourselves to the position of mere dispensers, and in course of time mere handers out of ready compounded articles,

4 Unless pharmacy provides the facilities for this type of work the best students will either never enter our ranks or, if they do, will leave us to seek the opportunities for additional education and research elsewhere

5 For the benefit of every person on the pharmaceutical register we want to see within the Pharmaceutical Society all the best brains engaged on pharmaceutical work, we know that there is scope within pharmacy for the very best students turned out by the secondary schools and universities

In his closing remarks Mr Linstead said

'I am conscious that there are many of you who feel that we are to day as a calling, more than fitted for our daily needs That that is so I am not prepared to admit Judging by the standard of the work that falls to a large number of pharmacists to day there may be some truth in that statement But if we look at the problem from the point of view of what pharmacists might be doing or ought to be doing, then it becomes clearer that we cannot give too much attention to the scientific development of pharmacy Unless pharmacy is scientific it has no reason for its existence "

Nearly one hundred years ago Jacob Bell wrote in *The Pharmaceutical Journal*

" 'In conclusion, it may be as well to recapitulate the moral which may be drawn from our past history, namely, that political controversies and mercenary disputes are injurious to the interest and character of all parties—that the most effectual method which any class of men can adopt for securing their political rights, and advancing their professional standing, consists not in disputation and warm argument, but in a steady and persevering attention to intellectual improvement, and the establishment of such regulations as are calculated to ensure collective privileges by increasing the amount of individual merit '

' There is a good deal of smug Victorianism in that, but the main object is clear Those words are true to day, and always will be true "

REVISION OF THE NRA

In the order of development it was to be expected that the NRA would have to undergo revision It is not a fault of the Administration, but a second phase of the development, a very important one if it is to mean permanent establishment While admitting failures the new deal can certainly claim successes In the revision it is the task of the Recovery Administration to discard the bad and retain the good and not over-complicate by adding complications It is hoped and rightfully expected that the public will be patient and give the NRA time to vindicate itself confidence and faith in the Administration s efforts and fair dealing and direction on the part of the Administration offices are not only important but essential

PHARMACISTS PART IN ETHER AND CHLOROFORM ANÆSTHESIA

David F Jones, former president A PH A on the occasion of the State meeting of South Dakota physicians and surgeons installed a window representing a miniature operating room, which caused much favorable comment We do not know whether Dr Jones brought into his exhibit historical references to the part pharmacists had in the early use of ether and of chloroform The PROCEEDINGS of the ASSOCIATION and the JOURNAL have many articles on the discovery of ether anæsthesia—see editorial October 1933 JOURNAL A PH A, page 937 See page 70 (1932) JOURNAL A PH A for note on Chloroform Pharmacy ' See also ' The Centenary of Chloroform,' JOURNAL A PH A, for May 1931, page 481 Recently J P Gilmour, former editor of the *Pharmaceutical Journal* (Great Britain) has contributed a comprehensive article to the *Chemist and Druggist* on 'Simpson's Discovery,' wherein mention is made to David Waldie Duncan Flockhart & Co pharmacists of Edinburgh, and to E Northway Nutt, prominent in affairs of the British Pharmaceutical Society

MATÉ

From time to time efforts have been made to introduce maté Paraguay Tea as a daily beverage Just now the use of it is being studied for the Army troops Many references may be found in the Index to the PROCEEDINGS In the volume for 1884 an historical article by Dr Peckholt is abstracted and in the JOURNAL for 1922, page 609 is a comprehensive report on The Astringent Principle of Maté,' by Josiah C and Bertha L DeG Peacock. The content of caffeine according to Dr Peckholt varies greatly and seemingly, due to the source of supply It would, therefore seem that if the variation is as stated, the amount of caffeine in the product should be given

---

PERSONAL AND NEWS ITEMS

Among the speakers, not mentioned heretofore, at the Century of Progress in Chicago are Prof Charles E Smythe, of the School of Pharmacy, University of Minnesota, and Prof Freeman P Stroup, of the Philadelphia College of Pharmacy and Science

Edwin E Taiber, in a communication to the JOURNAL, commends the NRA in no uncertain terms

Dr Noel E Foss is now a member of the faculty of Duquesne University, School of Pharmacy he will supervise research in certain fields of organic chemistry

Ambrose Hunsberger, assistant administrator of the Federal Alcohol Board, is recovering nicely, following an appendicitis operation

Julius A. Koch, former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, was guest of honor at the annual Alumni Reunion banquet of the School of Pharmacy, of the University of Pittsburgh This was the 50th anniversary of his graduation from the school

Heber W Youngken and Ivor Griffith were honored with the degree of Doctor of Science by Bucknell University This was the 25th anniversary of the graduation of the former from Bucknell with the A B degree

Among recent visitors at the American Institute of Pharmacy were Prof E N Gathercoal, Mr and Mrs Frank H Freericks, John E Kramer, registrar Philadelphia College of Pharmacy and Science W M Hankins Florida Board of Pharmacy, Prof St. Elmo Brady, Fisk University, Prof Leon Monell, Buffalo University S Ruffin Horne, Fayetteville, N C

R. R. Gaw, Pennsylvania Pharmaceutical Association, in his presidential address gave his views relative to the trend of pharmacy

Miss Mary Robinson—daughter of the late James Scott Robinson member of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1869–1923 Memphis Tenn.—has erected a

building for his pharmacy as a memorial to her father It is a beautiful structure, expressive of Mr Robinson's conception of pharmacy For more than 60 years 36 000 prescriptions annually have been dispensed in this pharmacy, Frank W Ward long an associate, presides over this well and favorably known establishment

Dr Roland Schaffert has been made instructor in physics at Duquesne University

Prescott R. Loveland, secretary of New Jersey Pharmaceutical Association is secretary of the state committee on Public Health and Welfare

Charles H Blaney, of Baltimore donated a large brass counter balance with a set of block weights to the American Institute of Pharmacy The pans are 10 inches in diameter and the standard is about 29 inches tall, the arms of the beam are stamped "Baltimore

Mrs C W Richardson, of Washington, D C has donated a stone mortar from Southern s drug store, and an ointment jar, from the drug store of a brother of John Paul Jones, in Fredericksburg Va

THE UNITED MEDICINE MANUFACTURERS

The United Medicine Manufacturers of America will hold its annual business convention in the Waldorf-Astoria New York City, October 10th to 12th Among the most important subjects to be taken under consideration in the three day meeting will be the elimination of false and misleading advertising, wholesale and retail drug trade relations, Department of Agriculture and Federal Trade Commission activities, drug code developments and legal and legislative action

OBITUARY

GEORGE F BIGHAM

George F Bigham, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, second vice-president of the National Association of Retail Druggists and a member of the Bigham-Dambach Drug Company of Buffalo New York died at his home, July 31st following a stroke suffered the day before He was born in Ontario 61 years ago He came to Buffalo N Y 35 years since and had been in the drug business there until now Mr Bigham had been president of both the Buffalo and New York State Pharmaceutical Association and the Greater Buffalo Drug Club, and was treasurer of the Western New York Trades Conference He is survived by his widow and a brother J Clayton Bigham of Vancouver

W E GREINER

W E Greiner vice president of the South western Drug Corporation and prominent in Dallas, Tex civic life for many years died August 16th He was a member of the Dallas Board of Education for many years serving as president for seven years, and he was the first president of the Dallas Athletic Club which he helped organize He also served as president of the National Association of Wholesale Druggists Mr Greiner graduated from Chicago College of Pharmacy in 1888 He is survived by his wife one son, William E Jr , and a daughter Miss Adelia Greiner

EDWARD CRAWFORD LONG

The funeral ceremonies for Edward Crawford Long son of Crawford W Long, were held in San Antonio, Texas, July 26th Mention is here made because of his father's discovery of ether as an anæsthetic Sketches of the latter have appeared in the PROCEEDINGS and the JOURNAL OF THE ASSOCIATION

James C Munn, former secretary of the Northern California Retail Druggists' Association and a pharmacist of Oakland died at the Johns Hopkins Hospital in Baltimore, Md June 1st

A native of South Dakota and a graduate of Northwestern University Chicago class of 1917 Mr Munn came to California ten years ago He took an active interest in association affairs, served as president of the Alameda County Pharmaceutical Association and was one of the prime movers in the formation of the Northern California Retail Druggists' Association

SOCIETIES AND COLLEGES

TENTH ANNUAL OBSERVANCE OF NATIONAL PHARMACY WEEK, OCTOBER 8th–13th

Chairman Anton Hogstad has announced that this year marks the tenth annual observance of the National Pharmacy Week movement, a movement that has accomplished a great deal in bringing the message of Pharmacy to members of allied professions as well as to the laity In addition, it has served as a means of arousing many pharmacists to greater achievements along professional lines, all of which speaks well for the fine support it has received *It is hoped that the 10th annual observance will far eclipse any previous observance* The Grand Prize of this year will be known as the "Robert J Ruth Memorial Trophy"

OFFICERS OF STATE ASSOCIATIONS—CONTINUED

CONNECTICUT

Connecticut Pharmaceutical Association held its annual meeting in New London A midwinter meeting will be held in Hartford The following officers were elected for the ensuing year *President* William J Coughlin, West Haven, *Vice-Presidents*, William J Cody, Bridgeport, Joseph A Murphy, Middletown, and Ernest A Opperman, Torrington, *Secretary and Treasurer*, P J Garvin, New Haven

MAINE

The Maine Pharmaceutical Association held its sixty seventh annual convention at the Belgrade Hotel Belgrade Lake, June 27th to 29th The Maine Cosmetic bill was freely discussed by proponents and opponents The officers were reelected for the ensuing year *President*, Burton K Murdock Kennebunk, *Vice-Presidents* Ralph A Lockhead Auburn, Horace T Poland Damariscotta, and Ralph H Trecartin Phillips, *Secretary* James H Allen, Waterville, *Treasurer*, George O Tuttle, Portland

MICHIGAN

Michigan held its annual meeting in Pontiac June 26th–28th, and registered a successful convention The following officers were elected for the ensuing year *President* James E Mahar, Pontiac, *First Vice President*, Ben Peck, Kalamazoo, *Second Vice President* Joseph Maltas, Sault Ste Marie, *Treasurer*, Henry Hadley, Benton Harbor, *Secretary* Clare F Allen, Wyandotte

MONTANA

Montana Pharmaceutical Association met in Helena, July 23rd–24th An anti peddlers' ordinance was endorsed Dean Charles E Mollett was one of the speakers The following officers were elected for the ensuing years *President* Emil Schoenholzer, Billings, *First Vice President*, George W Sparrow, Anaconda *Second Vice President*, Charles McFarland Helena, *Third Vice President*, Walter Clark, Havre, *Treasurer*, C A Challman, Hobson, *Secretary* J A Riedel, Boulder Anaconda was named as the meeting place for 1935

NEW HAMPSHIRE

New Hampshire Pharmaceutical Association elected the following officers *President*, Leo L Desparte, Lebanon, *First Vice President*, George Moulton, Peterboro, *Second Vice President*, William Ryan, Keene, *Third Vice President*, Lawrence E Cate, Rochester, *Secretary*, Rodney A Griffin Franklin, *Treasurer* Edgar E Goulet, Manchester

OKLAHOMA

Oklahoma Pharmaceutical Association elected the following officers *President* Coleman Davis, Seminole, *First Vice President* Cecil Carter, Shawnee, *Second Vice President* W R Franklin, McLoud, *Secretary*, Elbert R Weaver Stillwater, *Treasurer*, G C Cooper, Vian

Prof Anton Hogstad, Chairman of the National Pharmacy Week Committee, conducted a professional pharmacy program which created general interest

OREGON

The forty-fifth annual meeting of Oregon Pharmaceutical Association was held at Gearhart, July 9th–11th A larger number of retail pharmacists than usual were in attendance Fair Trade' and No Peddling" bills were favored The following officers were elected for the ensuing year *President*, Roy A Perry, Portland, *Vice President*, John F Allen, Corvallis, *Secretary*, Charles I Clough, Tillamook, *Treasurer* Louis Larson, Portland

RHODE ISLAND

The sixtieth annual meeting of Rhode Island Pharmaceutical Association was held at the Ocean House, Watch Hill The principal speaker was Dr Dennet L Richardson superintendent of Public Health Clarence A Vars of Westerly was elected *President* and James J Gill was continued as *Secretary and Treasurer*

SOUTH CAROLINA

South Carolina Pharmaceutical Association met in Charleston, June 20th–21st An open forum on business and professional subjects was the order of the day The following officers were elected *President*, L E Bishop Laurens, *First Vice-President*, J D Ashmore, Greenville, *Second Vice President* Samuel B Mitchell, Sr , Sumpter, *Third Vice President* Carson Luther, Hartsville, *Secretary-Treasurer*, J M Plaxco, Due West *Executive Committee* Hilton Ratteree, Rock Hill W L Steissegger, Charleston

SOUTH DAKOTA

The South Dakota Pharmaceutical Association met in Brookings There was an open protest against the sale of grocery items in drug stores

The following officers were elected *President*, George Lloyd, Spencer, *Vice President*, L A Daniels, Sioux Falls, *Secretary*, Rowland Jones Jr , Gettysburg *Treasurer*, F S Bockhoven, Clark

TEXAS

Texas Pharmaceutical Association held its annual session at Mineral Wells The officers of the Association were installed by Dean W F Gidley as follows *President* A H Seeley, Belton, *First Vice President* C C Harris, Houston, *Second Vice President* B B Brown Dallas, *Secretary Treasurer*, Walter D Adams, Forney *Executive Committee*, Shine Philips, Big Spring, H P Gaddis, Cotulla J P Frazier, Fort Worth

Lee Stinson who presided over the sessions was presented with a loving cup Former president Edna Gleason of California Pharmaceutical Association, was one of the speakers of the convention, she received from William Ochse as a memento of her visit a 44-caliber pearl handled revolver, with lessons in the art by Walter H Cousins

UTAH

The following officers were elected *President*, John E Booth Spanish Fork, *First Vice-President*, J W Christenson, Provo, *Second Vice-President*, Fred R Elledge, Salt Lake City, *Secretary* George F Flashman Salt Lake City *Treasurer*, June W Clark Ogden *Executive Committee* John E Booth, *Chairman* J W Christenson, George F Flashman

Taxes, new and old, were also subject to much discussion It was unanimously agreed to adopt the manufacturer's wholesale list price per dozen" provision for the State code to replace the original minimum price provision of ' cost plus 15 per cent " Further it was decided to add a 10 per cent mark-up for labor in Utah and to ask the Governor to sanction such a provision

VERMONT

The Vermont Pharmaceutical Association which met in Fairlee, June 17th–19th, was unusually well attended A proposed federation of state associations was discussed, plans set in motion for a fair trade law and the code came in for its share of attention The following officers were elected *President*, H E Coleman, Barre, *First Vice-President*, George T Donovon, Fair Haven, *Second Vice President*, Joseph W Blakely Montpelier, *Third Vice President*, Fred W Wheeler, Springfield, *Secretary-Treasurer*, Welcome B Eastman, St Johnsbury

WASHINGTON

Washington Pharmaceutical Association held its annual meeting at Olympia A new plan of organization for the Association was adopted Approval was given to a joint meeting in Portland with Oregon Pharmaceutical Association The following officers were elected for the ensuing year *President* Charles G Ajax, Seattle, *Secretary*, Harry W Ayres, Seattle, *Treasurer*, Walter H Hinman, Seattle, *Board of Managers* L D Bracken, Seattle, Frank R Robertson, Spokane, George A Todd, Tacoma, R M Ragsdale, Wenatchee and Graham A Condie, Seattle

WISCONSIN

Wisconsin Pharmaceutical Association met in Fond du Lac June 19th–21st It was decided to hold a winter convention as well as a summer one, and a committee was ap-

pointed to report back on the State code at that time

The following officers were elected *President*, S H Dretzka, South Milwaukee, *First Vice President*, Ed Schweger, Green Bay, *Second Vice President*, Karl J Henrich, Superior, *Third Vice President*, William Hoeschler, La Crosse, *Secretary*, Jennings Murphy, Milwaukee, *Treasurer*, B F Leidel, Milwaukee

It was reported that during the year the association membership had increased one hundred per cent

WYOMING

Wyoming Pharmaceutical Association met in Casper, June 25th–26th The meeting was the largest in the history of the Association The code came in for its share of discussion Casper was chosen for the 1935 convention

The following officers were elected *President*, George R Arnold Thermopolis, *First Vice President*, H H Cordiner, Laramie *Second Vice-President*, Rock Springs, *Secretary Treasurer* John B Tripeny Casper

MANUFACTURING CHEMISTS ASSOCIATION OF THE UNITED STATES

The Manufacturing Chemists Association of the United States met in the sixty second annual convention in New York City

The following officers were elected *President*, W B Bell, New York City *Vice-President*, E M Allen, New York City, George W Merck, New York City, *Treasurer* J W McLaughlin New York City, *Secretary*, W N Watson, Washington, D C

ANNUAL CONVENTION OF AMERICAN PHARMACISTS ASSOCIATION

A NATIONAL ASSOCIATION OF EMPLOYEE PHARMACISTS

The convention of the American Pharmacists Association was held in San Francisco, August 1st–4th Among the speakers of the convention were John Culley Edna Gleason, G H Frates, former presidents of California Pharmaceutical Association

N A R D IN NEW ORLEANS

The New Orleans Association of Commerce is giving publicity to attractions and history of the interesting city where the National Association will hold its annual convention, September 24th–29th

Fifty-two of the architectural treasures New Orleans has saved from historic days of long before the Civil War are being recorded, photographed and sketched in detail for posterity by the Historic American Buildings Survey being conducted by the United States Government in Louisiana

Fourteen of the projects in New Orleans and vicinity have been finished They include the home of Gen P G T Beauregard the Archbishopric, the Mississippi Valley's oldest building built in 1734, the original Spanish Customs House, the Cabildo seat of the Colonial government, the Presbytere, companion of the Cabildo, the old Spanish Arsenal, the René Beauregard house at Chalmotte the field of the Battle of Orleans, the original Louisiana State Bank building, the Girod House, built as a refuge for Napoleon, the House of the Daughters of 1812, Jackson Square, the Barbarra House and Garconniere at St Rose Ormond Plantation, Angelina Plantation Mt Airy

LEGAL AND LEGISLATIVE

NEW JERSEY REQUIRES POISON LABEL ON DI-NITRO PHENOL

In order to safeguard the public and to warn prospective users of its toxic properties it will be required in the State of New Jersey that all preparations of Di Nitro Phenol, as well as the chemical itself must be labeled poison" under the provisions of Schedule A of Section 6 of the Pharmacy Act and that sales of this chemical and preparations containing it must be registered The requirements for selling poisons listed in Schedule A are as follows It shall be unlawful for any person in this State to sell or deliver to any minor under twelve years of age or to any persons known to be of unsound mind or under the influence of liquor any of the substances enumerated in Schedule A or Schedule B appended to this section or any other poisonous drug chemical or medicinal substance

PETITION TO TERMINATE THE EXEMPTION GRANTED IN PARAGRAPH III OF ADMINISTRATIVE ORDER X 36

WHEREAS Administrative Order No X 36 in Paragraph III exempts from required payment of Code Authority assessments, those members of the Industry who are engaged in some other line of business which business is their principal line of business, and which Paragraph reads as follows

Pending determinations by NRA with respect to specific Codes upon cause shown by a Code Authority or otherwise, every member of a trade or industry is hereby exempted from any obligation to contribute to the expenses of administration of any Code or Codes other than the Code for the trade or industry which embraces his principal line of business provided that he shall submit such information and comply with such regulations with respect to such exemption as NRA may require or prescribe "

The Code Authority for the Soap and Glycerine Manufacturing Industry petitions that the Administrator terminate the exemption granted in Paragraph III of Administrative Order X 36 except as to members of the Soap and Glycerine Manufacturing Industry

The Administrator has given notice that any criticisms of objections to, or suggestions concerning said Amendment, Budget and Basis of Contribution and Application for Termination of Exemption under Administrative Order No X 36 must be submitted to Deputy Administrator Joseph F Battley, Room 4527, Department of Commerce Building, Washington, D C prior to Monday, August 20, 1934, and that the Administrator may approve said amendment, said budget and basis of contribution and termination of exemption in their present form and/or such form, substance, wording and/or scope as they may be revised on the basis of criticisms, objections or suggestions submitted and supporting facts received pursuant to this notice, or other consideration properly before the Administrator

---

BOOK NOTICES AND REVIEWS

A Textbook of Organic Chemistry By JOSEPH SCUDDER CHAMBERLAIN Ph D Professor of Organic Chemistry Massachusetts State College Published by P Blakiston's Son and Company, 1012 Walnut Street Philadelphia Pa 1934 Third edition revised, XXV + 873 pages Price $4 00

This book is a textbook of organic chemistry for undergraduate students In its method and order of treatment the volume is an expression of the author s many years of experience teaching organic chemistry to students—most of whom plan to take up chemistry as a profession The subject matter is presented in a sufficiently elementary manner so that it is not beyond the grasp of the student in his first course in organic chemistry, and at the same time the work is made sufficiently comprehensive to cover the whole field by taking up most of the important compounds

In effecting a revision for the third edition, the author has condensed the book by about two hundred pages This was done by creating a part III under the title 'Supplementary Topics " The content of this part is not new but has simply been transferred from preceding pages in earlier editions Part I treats of acyclic or aliphatic compounds, Part II treats of cyclic compounds and Part III treats of such subjects as Petroleum, industrial sugar and cellulose, amino acids and the constitution of proteins, coal tar, reactions of diazo compounds dyes terpenes, uric acid and alkaloids This arrangement was adopted to enable teachers to restrict the portion actually covered in class room teaching to the first two parts and use the supplementary topics for additional study when desirable A revision of portions of the text has been made to bring in modern theories and the latest researches in carbohydrate chemistry The chemical and physical conditions under which reactions take place have also been added where previously omitted

An especially valuable feature of this text is a comprehensive classified reference to laboratory preparations in organic chemistry which is placed in the appendix This compilation contains references to the methods of preparation of organic compounds in about twenty seven of the better known laboratory guides of organic chemistry This scheme makes it possible to ascertain readily where to find the

specific details of procedure for the preparation of a great number and variety of compounds

One might criticize the omission of certain important medicinal compounds from the text, such as epinephrine, ephedrine, tribromethanol, calcium gluconate and thryoxin The book is not written from a pharmaceutical viewpoint, however, and the author does not claim to have treated of all compounds or even all groups of compounds A sufficient number and variety of compounds and groups of compounds is considered to give the student who studies all of the text a sound basis for further study and a comprehensive knowledge of the most important relationships and compounds or groups of compounds representing the immense field of organic chemistry —GLENN L JENKINS

Nos Plantes Medicinales de France Another set of these beautiful cards has been published there are eight cards in the set—7½ by 5½ inches and the price of the set is three francs Address your order to L'Office National des Matieres Premières, 12, Avenue du Marne, Paris The illustrations depict the plants or parts of them with remarkable resemblance enabling one to recognize the plant in nature The backs of the cards give information relative to the plant, its botany, pharmacognosy, uses and names of plants in a number of languages - French, English, German, Italian, Spanish Chart 81 illustrates the cork tree, method of gathering the bark, the leaves, flower and fruit and explains its uses This set includes the following, Blackberry, Hazel, Bearberry, Barberry, Squill, Poppy, Rose geranium and Parietary

---

PRESCRIPTIONS, MEDICINES AND HOSPITAL SUPPLIES REPRESENT OVER 50 PER CENT OF DRUG STORE SALES

According to Frank A Delgado, Chemical Division, Department of Commerce, over 50 per cent of the sales of the 58 258 drug stores in the United States are devoted to prescriptions, drugs and patent medicines, rubber goods, surgical and hospital supplies and other products associated with the professions of medicine and pharmacy and the preservation of public health Details of drug store receipts are shown in the following table, broken down into 34,844 drug stores with soda fountains, 23,414 drug stores without soda fountains and 58,258 drug stores with and without fountains

Public Health Items and Service	With Fountain		Without Fountain		All Drug Stores	
	Million $	%	Million $	%	Million $	%
Prescriptions	106	9 2	101	18 6	207	12 2
Drugs, Patent Medicines, etc	356	31 0	219	40 4	575	34 0
Hospital and First Aid	21	1 8	19	3 5	40	2 4
Rubber Goods	21	1 8	15	2 7	36	2 1
Toiletries						
Toilet Articles	34	3 0	19	3 5	53	3 1
Toilet Preparations	95	8 3	65	12 2	161	9 5
Soda, Candy, Tobacco						
Fountain	234	20 4			234	13 8
Bottled Beverages	6	0 3	1	0 2	7	0 4
Tobacco	160	13 9	42	7 7	202	12 0
Confectionery	46	4 0	10	1 9	56	3 3
Other						
Stationery, Books and Periodicals	21	1 6	12	2 2	33	2 0
Sundries and Miscellaneous	19	1 3	28	7 1	87	5 2
Total Sales	1149	99 6	531	100 0	1691	100 0

These figures have been compiled from a report entitled Drug Retailing, one of a series of special trade studies prepared from data assembled in the first nation wide Census of Distribution by the Bureau of the Census The report brings together, in one bulletin, much of the available information on the operation of drug stores and in addition is supplemented by certain pertinent facts about competing stores

PHARMACY WEEK

EXCERPTS FROM CHAIRMAN ANTON HOGSTAD'S MESSAGE

THE secretaries of our various pharmaceutical organizations are urged to secure a word of greeting from the Governors of the respective states Do not delay in this matter In previous years we have secured some worth while words of greetings from State Executives which supplement in a nice manner the President's proclamation

PHARMACY WEEK MAPS

Secretary E L Newcomb, National Wholesale Druggists' Association has informed the National Pharmacy Week Executive Committee that he has a goodly supply of beautiful lithographed Pharmacy Week maps on hand, including that interesting map dealing with the medicinal plants of the United States

These maps can be secured through your service wholesaler or by writing to Dr E L Newcomb at 51 Maiden Lane, New York City During the course of the past few years hundreds of requests have been received for these maps from High Schools and Colleges Here is a splendid opportunity for the retail pharmacist to assist the High School or College in the community by presenting these institutions with copies of these maps They will accomplish a great deal in bringing the message of Pharmacy to those attending these institutions

'OPEN HOUSE" AT THE COLLEGES OF PHARMACY

The Colleges of Pharmacy are in an excellent position to render the profession a real service during Pharmacy Week by having Open House' at the college in question, and to invite all members of the faculty and student body of the entire college or university as well as to extend invitations to members of allied professions and to the laity

MIMEOGRAPHED COPIES OF TALKS AVAILABLE

As in former years the National Pharmacy Week Executive Committee will distribute upon request some twenty or more human interest appeal stories in mimeographed form Arrange now with the secretaries of your various community organizations for the presentation of one or more of these interesting stories Simply address the Chairman at 2215 Constitution Ave, Washington, D C, and copies will be sent you free of charge

WINDOW DISPLAYS

Many pharmacists are prone to feel that it requires considerable money as well as an expenditure of considerable time for the preparation of a professional window display This is not altogether true, for in many cases all that is needed is a captivating title a few materials, a few well worded show cards all of which, if properly arranged will bring into being a dramatic and interesting display

Have a photograph made of your window display preferably by a commercial photographer The photographs best set forth the detail if they measure at least eight by ten inches The photographs should be submitted to the secretary of your State pharmaceutical organization on or before December 31, 1934 The State Secretary in turn will select the State winner and will then submit the prize-winning photograph for the state in question to the National Pharmacy Week Window Display Contest Committee The national winner will then be selected by this Committee which for 1934 will comprise outstanding personages in the Drug Trade Industry of New Orleans

The 1934 Pharmacy Week observance is just around the corner Let us impress the members of allied professions as well as the laity that Pharmacy is a profession, that you are glad of the fact that you are a pharmacist and that you have taken an active part in making the 10th annual observance one long to be remembered The year 1934 marked the dedication of the American Institute of Pharmacy your Institute at Washington D C In many respects the year 1934 has meant a great deal to Pharmacy—let us make the week, October 8th–13th, a Pharmacy Week in every respect

CHARLES H EVANS

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII SEPTEMBER, 1934 No 9

CHARLES H EVANS

Charles Hall Evans was born December 15, 1895, at Norwood, Ga , the son of William T and Mary Hall Evans He received his early education in the public schools and Warrenton High School In 1915, he graduated in pharmacy from Mercer University, Macon, Ga , and is a member of Eta Chapter, Sigma Nu and the Alembic (Science) Club After graduation he entered the pharmacy of his father and was admitted to partnership in the three stores operated by the firm in Warrenton, Norwood and Harlem, after the death of his father, in 1926, he became sole owner, he is now operating two pharmacies in Warrenton

Mr Evans has been a member of the Georgia State Board of Pharmacy since 1928, from 1932 to 1934 he served as vice-president and chairman of District No 7, and this year he was elected president of the National Association of Boards of Pharmacy He was chairman of the Georgia Board of Pharmacy when the college prerequisite amendment was enacted, and is chairman of the Legal Committee of Georgia Pharmaceutical Association in charge of a revision of the pharmacy law for presentation to the 1935 session of the legislature He is a member of the Board of Directors of Georgia Pharmaceutical Association

Mr Evans takes an active interest in civic affairs and is a past-president of Warrenton Chamber of Commerce, is chairman of the Board of Education of Warrenton public schools and of a number of other various local organizations He is a member of the Warrenton Methodist Church, a steward, trustee and the treasurer

February 6, 1917, Mr Evans married Miss Sarah Rodgers Lang of Danielsville, Ga , they have one son

---

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave WASHINGTON D C

OUR STAND ON FEDERAL DRUG LEGISLATION

BY ROBERT P FISCHELIS *

LAST year, due to lack of knowledge of the facts or misinformation, the profession of pharmacy was classified in the minds of many laymen and members of other professions as an opponent of new legislation to strengthen the Federal food and drug law Out of the maze of propaganda for and against the enactment of more stringent regulations to govern the manufacture, distribution and advertising of food, drug and cosmetic products, we emerged, in the eyes of the public, as weak proponents of obviously necessary reforms and as strong opponents of regulatory measures containing the necessary "teeth" to enforce the reforms which we really favored It is unfortunate that the AMERICAN PHARMACEUTICAL ASSOCIATION, which has prided itself since its organization in 1851, upon being a champion of legislation to suppress the distribution of inferior, adulterated and deteriorated drugs, should have been placed in this position Year after year, the ASSOCIATION has placed itself on record against fraudulent practices in the manufacture, sale and advertising of drugs and cosmetics It is also on record in favor of at least partial formula disclosure of so-called patent medicines and other secret remedies

In all of the publicity attending the various hearings on proposed drug and cosmetic legislation last year, the voice of the AMERICAN PHARMACEUTICAL ASSOCIATION was not heard because it was submerged in the unified opposition offered by the "drug trade" to certain features of the legislation proposed by the Government to stamp out evils which have crept into the food, drug and cosmetic industries and with which the Government is unable to cope under existing law

We can very well be proud of the efforts made by the AMERICAN PHARMACEUTICAL ASSOCIATION in its attempt to present pharmacal opinion in unified form through the National Drug Trade Conference which the ASSOCIATION called into being However, when interests represented in the Conference indulge in the type of propaganda which was used last year to defeat proposed food, drug and cosmetic legislation, we must take steps to make our position clear and let it be understood in no uncertain terms that we are not a party to such a program

The new Congress will undoubtedly give attention to food, drug and cosmetic legislation The AMERICAN PHARMACEUTICAL ASSOCIATION is convinced of the necessity for constructive and, in some respects, drastic revision of existing food and drug laws As the acknowledged representative of professional pharmacy in the United States, it will endeavor to lend the full weight of its influence toward the enactment of reasonable, effective and enforceable legislation which will protect the consuming public against fraud of all kinds in the drug and cosmetic industry

It is recognized that laws which do not provide for adequate enforcement machinery had better not be written into the statute books The law-abiding citizen must put up with many irksome restrictions of his liberties in order to make it possible to apprehend the enemies of society The food, drug and cosmetic industries cannot expect the Government to protect the public against exploitation by the unscrupulous, with its incident protection of the honest manufacturer and distributor, unless sufficient power is granted to make law enforcement a fact and not a farce

* President AMERICAN PHARMACEUTICAL ASSOCIATION

AN IMPORTANT MESSAGE

A prominent American pharmaceutical manufacturing firm, which has contributed on several occasions to the Headquarters Building Fund in increasing amounts, has recently made without any restriction as to its use, the largest single contribution so far received by the ASSOCIATION and has paid it in full

In their letter or transmittal this firm made certain observations and statements with respect to present conditions in the practice of pharmacy, the changes that are necessary to enable the profession to render the public health service expected of it, the urgency of dealing effectively with the present situation and the part that the ASSOCIATION is prepared and should be equipped to take in this important work, which are so clear and forceful that permission has been obtained to quote them, as follows

"We know of no organization that can, provided that it is adequately financed, contribute more to build up the reputation and prestige of pharmacy, and improve the service of pharmacy in the public health field than the AMERICAN PHARMACEUTICAL ASSOCIATION Our confidence is justified by the past achievements and efforts of the ASSOCIATION these have ever been sincere, helpful and altruistic Unfortunately, however, they were limited through lack of proper quarters for the ASSOCIATION and sufficient financial support Now at last one of these handicaps has been removed through the ASSOCIATION'S occupancy of its beautiful new structure

"There remains the urgent need to provide a maintenance fund so that the AMERICAN PHARMACEUTICAL ASSOCIATION may achieve its objectives of service to the profession of pharmacy and to the public

"We deemed it a duty and privilege to contribute to the New Building Fund of the ASSOCIATION, and now we desire to give support to the ASSOCIATION'S activities Accordingly, we enclose our check for fifty thousand dollars for such use as your Council may decide upon

"May we add that we do not consider this subscription a gift Instead, we look upon it as a subsidizing of work to improve the economic side of pharmacy through building up its prestige and improving its service This is work which we, as an individual concern or in cooperation with a group of manufacturers, are unable to carry on Unless the work is conducted effectively, we fear that the present confusion in pharmacy may culminate in the death of pharmacy We feel, therefore, that in subsidizing the work of the ASSOCIATION we are aiding the profession of pharmacy and the public, and, moreover, safeguarding the future of our own company, the pharmaceutical industry and the retail pharmacist

"We earnestly hope that the efforts of your Council to raise a maintenance fund may result in quick provision of the funds you need, for we believe the situation in the field of pharmacy and the services your ASSOCIATION will render require immediate action"

This estimate of the undesirable conditions which threaten the future of pharmacy and the urgent need for correcting them, is so sound and so correctly expressed that every one interested in promoting pharmaceutical progress should have the opportunity to read it —H A B DUNNING, *Chairman, Committee on Maintenance Fund*

AN OPEN LETTER TO RETAIL PHARMACISTS ON THE AMERICAN INSTITUTE OF PHARMACY

THE AMERICAN PHARMACEUTICAL ASSOCIATION does not need a million-dollar maintenance fund for the American Institute of Pharmacy immediately, and could probably fulfil its mission quite satisfactorily with half the amount mentioned, but it does require, within the very near future, approximately $100,000 00

The money which has been expended for the land, the building, its equipment, furnishings, planting, every expense included, amounts to $590,000 00 All but $76,000 00 of these costs have been met by the contributions received This $76,000 00 must be liquidated within the near future, and the ASSOCIATION, naturally, does not have the funds to take care of this relatively small debt, but is dependent upon those who are interested in the welfare of pharmacy and the ASSOCIATION to provide the money In addition to this, the ASSOCIATION, if it is to carry out effectively its conservative service plan, needs $12,000 00 to $15,000 00 additional income a year, and this would require several hundred thousand dollars to produce the necessary income

The service and development plan which has been formulated is one of great value to pharmacy in general, and is not only practical and conservative, but necessary

I can assure you that the emergency fund of $100,000 00 will be provided in one way or another, but I do hope that all who are interested in pharmacy will indicate their further approval of the work of the AMERICAN PHARMACEUTICAL ASSOCIATION by subscribing whatever may be deemed proper and equitable A few thousands of dollars will, I am sure, not mean much to the large interests, but will mean a great deal to this most worthy cause, which is in your interest and mine A few hundreds, or even a few dollars, from a large number of contributors would, in the aggregate, represent a considerable sum

I want to make clear that, under my guidance, the AMERICAN PHARMACEUTICAL ASSOCIATION has not over-reached itself in the development of this project, as represented by the American Institute of Pharmacy Building The quarters which have previously been occupied by the ASSOCIATION in Baltimore were entirely inadequate and the work has been carried out under most disadvantageous conditions and, yet, even though a special concession was made in the rent during the depressed times, the rental costs amounted to $1200 00 a year In the present building all operating expenses, including every cost, are less than $4500 00 This is due to the fact that the building is provided with automatic equipment of every kind, including heating, lighting, telephone, sprinkling system, etc , and, most particularly, that the property is tax free You will, therefore, understand that these splendid new quarters for the A PH A at present cost only $3300 00 more than the inadequate accommodations which they had here in Baltimore

The National Association Boards of Pharmacy have voted to place their executive offices in the building during 1935 and will share the expenses to the extent of $1000 00 minimum This will reduce the difference between the old costs and the new to $2300 00 Other non-profit organizations, such as the executive offices of the American Association of Colleges of Pharmacy, Enforcement Officers, and similar organizations, are seriously considering joining the Boards of Pharmacy organi-

zation in having their executive offices in this building and, in all probability, action will be taken within the near future This, you will understand, will reduce the overhead costs of the A PH A and of these associated organizations to a very reasonable basis and make the costs of operating in this fine building no greater, and perhaps less, than was formerly the case

The development of the museum and library is already progressing and will come through special contributions and donations So we need not worry about these two departments

The income from the membership dues of the A PH A just about pays operating expenses for the services given to the members of the ASSOCIATION There are special endowment funds which can be used for special purposes

The real reason for a maintenance fund is to give the opportunity to the A PH A to employ one or more outstanding pharmacists, having the crusader spirit, who will go into the building with the idea of developing educational propaganda and service features in the way of pamphlets, lectures, etc , which will aid in the regeneration of the practice of pharmacy

The immediate object of the A PH A and the service work in the Institute is to regenerate pharmacy through the education of the pharmacists and the stimulation of the public to demand a better professional service This can be accomplished by taking drugs out of the merchandising stores and establishing pharmacies which will sell drugs, sick-room requisites and accessories, but excluding the kind of merchandise which has no direct relationship to pharmaceutical practice This can, will and must be accomplished, because the public will demand it when it realizes the dangers of having inexperienced men dispensing drugs which are, in a large measure, poisons, and requires special knowledge and experience This regeneration will not happen immediately, because the public does not realize, as yet the full danger

I am convinced that, as long as drugs are used in the practice of medicine and for the cure of disease, the practice of pharmacy will be important, and I am equally confident that the public will realize it when the bad practice of pharmacy results in serious consequences, inclusive of accidental deaths, due to carelessness and inefficiency It is true that the pharmacist is better educated than ever before, but he has less opportunity to make use of his education, eventually he will, and that is the A PH A 's immediate job, to see that the pharmacist is provided with an opportunity to use the knowledge and information which he obtains in the schools I know you realize, as well as I do, that it would be a great loss to manufacturing pharmacy if we were obliged to distribute through merchandising stores having no professional aspects or prestige with the public

I have discussed the real purpose and plans of the A PH A as I see them, and can assure you that it is not attempting too large a program, not even a large program, and that it cannot fail and will not, but it can be seriously handicapped by having insufficient funds which could be so readily furnished by those who are interested in pharmacy and who would benefit greatly I am not a dreamer or an idealist, and I have never wasted money and do not intend to do so in this instance

Now, to explain the proposed research development This really represents an entirely separate proposition, in a sense An interested member has under consideration offering the first unit, of conservative size and practical value, of a build-

ing for research, immediately adjoining the present institute and in the rear of it This unit would probably cost $150,000 00 or more, but the plan involves the complete endowment of the undertaking, including the erection of the building, equipment, operating expenses and a fund to pay a limited number of research workers, entirely without cost to the ASSOCIATION The offer will not be accepted on any other basis You will understand that the research building will be no burden whatsoever on the ASSOCIATION, but will provide an opportunity for our workers on National Formulary and U S P problems, in cooperation with the voluntary work of the research divisions of the large manufacturing pharmaceutical houses I know you recognize that, although much of this investigative work is accomplished by individual voluntary workers and institutions, including the different drug institutions, it does and will require several investigators to confirm the tests, correlate the work and reach final conclusions

You, of course, know that the Food and Drug Division is demanding more and better service from the committees on the Pharmacopœia and National Formulary If they do not get the required standards from the present sources, they will, I fear, adopt their own standards, and this very important function of the Pharmacopœia and National Formulary may be lost to pharmacy, which would be a great catastrophe to pharmacy and the public There is quite a lot of necessary work that can be done in this laboratory building, if it is established, and, if not, in the small laboratory in the present building, which would be of great value to pharmaceutical practice, to the Food and Drug Division and to other divisions of the government The testing and standardizing of the vitamin content of cod liver oil and the distribution of standard samples of pharmaceutical manufacturers is a type of service that can be expected There is no doubt in my mind that the A PH A can be a great force in promoting satisfactory relationships between pharmacy, the Food and Drug Division and the various public health services which exist in Washington

I hope that all those interested in the practice of pharmacy and its importance to all phases of pharmaceutical endeavor and the public, will visit the American Institute of Pharmacy Building and take the opportunity to confer with Dr E F Kelly and others before making a final decision in regard to upholding the hands of the AMERICAN PHARMACEUTICAL ASSOCIATION by subscribing to the fund which is required to pay off the small indebtedness and establish a reasonable maintenance fund The subscription can be whatever amount might be considered proper, and any amount would be helpful—$25 00, $50 00, $100 00, $500 00, $1000 00 The whole amount may be paid in instalments over a period of five years A $25 00 subscription would represent $5 00 a year for five years, a $50 00 subscription would represent $10 00 a year for five years, a $100 00 subscription would represent $20 00 a year for five years, a $500 00 subscription would represent $25 00 each quarter for five years, a $1000 00 subscription would represent $50 00 a quarter for five years

Exclusive of my own donation, there has been subscribed, thus far, $61,250 00 —
H A B DUNNING, *Chairman, Maintenance Fund Committee*

SCIENTIFIC SECTION

THE ACTION OF ERGOT AND ITS ALKALOIDS ON THE PUERPERAL UTERI OF DOGS *[1]

BY EDWARD E SWANSON AND CHESTER C HARGREAVES

Since the isolation of the alkaloids, ergotoxine by Carr and Barger (1) in 1906 and ergotamine by Stoll (2), (3), (4) in 1920, the subject of ergot has been the source of considerable investigation Of distinct interest is the more recent work of Moir (5), who has shown clinically that ergotoxine is just as effective as ergotamine Moir (6) in the continuation of his clinical study, observed an effect with the fluidextract, when given by mouth, that has a much more rapid onset of action on the puerperal uterus than either ergotoxine or ergotamine

In our comparative pharmacological study of the fluidextract of ergot and its active principles by the various well-known methods the intact puerperal uterus of dogs has been helpful as a method of test

This method is based on the use of intact dog uteri, three to six days post-partum Under ether anesthesia, an elongated rubber balloon or bag (five inches long and one and one-half inches in diameter) is inserted through the vagina into either the right or left fallopian tube For definite location of the balloon in the uterine horn, an abdominal incision is made The balloon is attached to a tambour by a rubber tube Before each experiment this closed system is tested for leaks

In these experiments more than a hundred dogs were used The drugs were given by vein and by mouth in doses distinctly larger than that used by Moir (5), (6)

Clinically, Moir (5) has shown that ergotoxine or ergotamine in doses of 1 mg to 3 mg by mouth produces slow and erratic results on the uterus The onset of action is delayed for thirty-five minutes to one hour or more For the fluidextract or liquid extract B P 1914 given orally in doses of 2 to 4 drachms, Moir (6) observed that the onset of action on the uterus is strikingly shorter than that of the alkaloids

As shown in Table I, by the U S P Cock's Comb and Reversal Uteri Methods the various preparations, with the exception of the liquid extract of ergot B P, have approximately the same potency

By vein, as shown in Table II, the onset of action is approximately the same for the fluidextract, liquid extract B P 1914, ammonia extract, acetone extract, ether extract, ethylene dichloride extract, sulphur dioxide extract and alkaloids ergotoxine or ergotamine With doses of 0 2 cc per Kg of the fluidextract U S P, the liquid extract B P 1914, 0 1 mg of the various extracts or 0 1 mg per Kg of the alkaloids, the onset of action on the uterus is one to one and one-half minutes

* Scientific Section, A PH A, Madison meeting 1933

[1] This paper was passed by the Board of Review on Papers and returned to the authors for addition of kymographic tracings—*Editor*

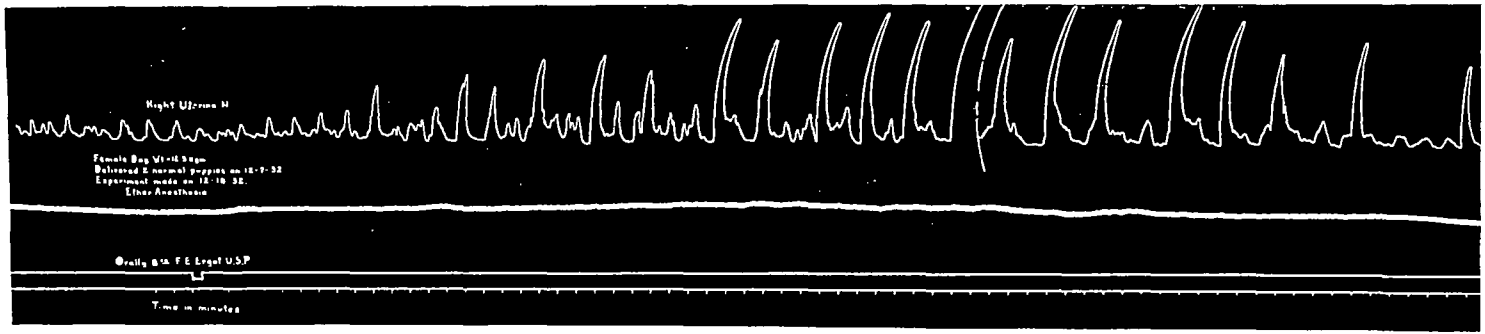


Fig 1 —Represents an etherized dog with recorded puerperal uterine contractions Fluidextract ergot U S P , 0 65 cc per Kg was given by mouth In ten minutes the uterus began to show increase in contractions These contractions increased in amplitude and remained strong for more than sixty minutes

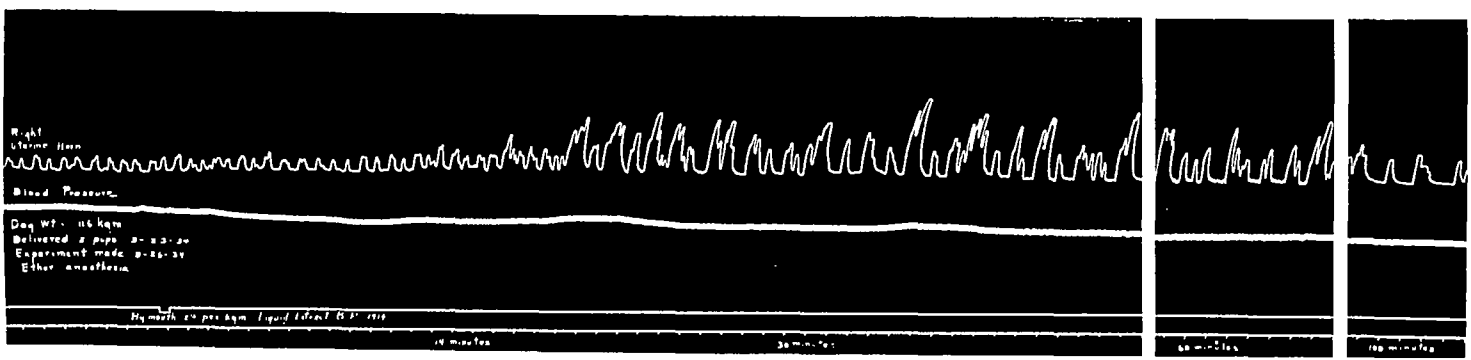


Fig 2 —An etherized dog with recorded blood pressure and puerperal uterine contractions Liquid extract of ergot B P 1914 2 cc per Kg was given by mouth In fourteen minutes the contractions of the uterus began to show stimulation The contractions were strong for more than one hundred minutes

Thus, by vein, the time of onset of action for the alkaloids is the same as that of the fluidextract of ergot U S P, the liquid extract of ergot B P 1914 or the various extracts

By mouth as shown in Table III, the onset of action of the fluidextract of ergot U S P, liquid extract of ergot B P 1914, various extracts of ergot (ammonia, acetone, ether, ethylene dichloride and sulphur dioxide) is more rapid than that of the alkaloids ergotamine or ergotoxine With a standard fluidextract of ergot U S P in doses of 0 2 cc to 1 cc per Kg (equivalent to 0 1 mg to 0 5 mg per Kg of the alkaloids) the onset of definite response is eight to twenty

TABLE I

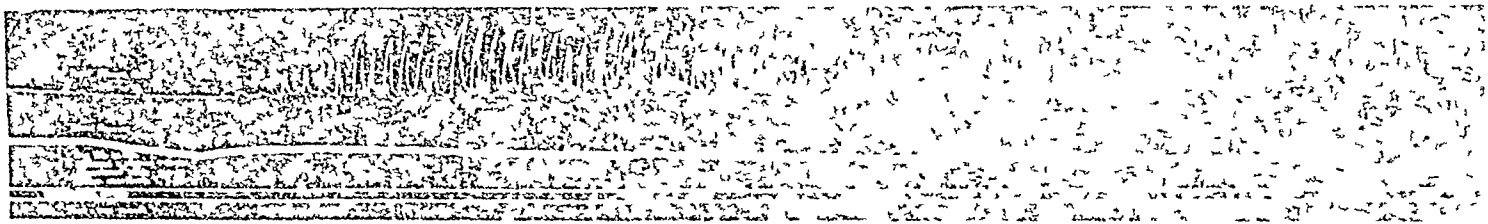
Preparation	U S P Cock's Comb Method	Reversal Uteri Method
Fluidextract Ergot U S P	100%	100%
Liquid Extract of Ergot B P 1914	25%	40% to 50%
Ammonia Extract of Ergot	100%	90%
Acetone Extract of Ergot		100%
Ether Extract of Ergot		90%
Ethylene Dichloride Extract of Ergot*	110%	112%
Sulphur Dioxide Extract of Ergot*	100%	80%
Ergotamine Tartrate Sandoz	100%	100%
Ergotoxine Ethanesulphonate	110%	120% to 130%

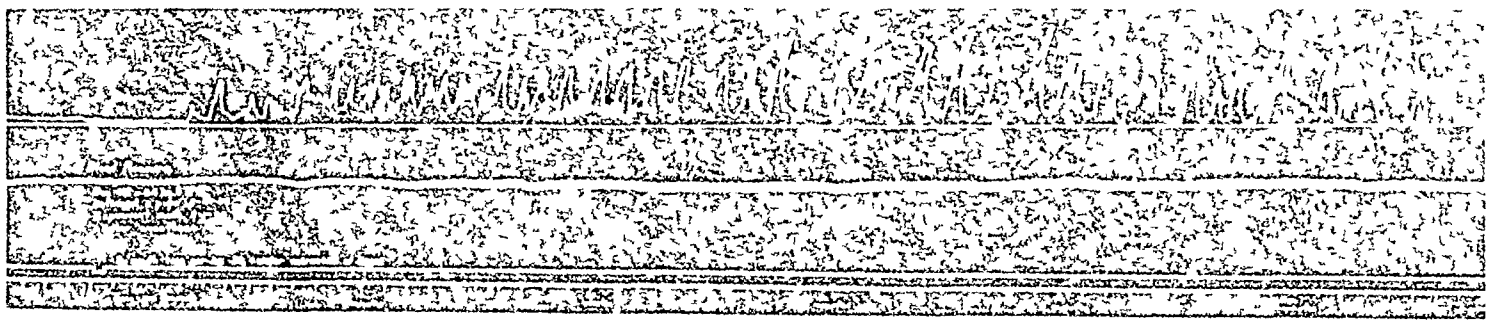
* Process patent applied for

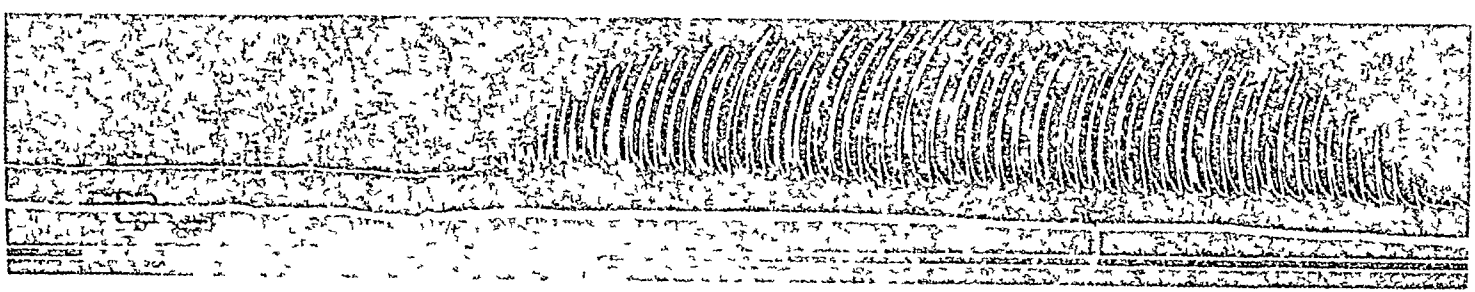
TABLE II—PUERPERAL UTERI OF DOGS INTRAVENOUS ADMINISTRATION

Dog No	Body Weight Kg	Number of Days Post partum.	Drug	Dose in Cc or Mg per Kg	Time of Onset of Definite Response Minutes	Duration of Action Minutes	Remarks Contractions
1	8 5	5	Fluidextract of Ergot U S P	0 2 cc	1 5	40	Strong
2	15 0	4	Liquid Extract of Ergot B P 1914	0 2 cc	1 0	25	Strong
3	9 8	4	Ergotoxine	0 2 mg	1 0	30	Strong
4	8 9	5	Ergotamine	0 1 mg	1 5	35	Strong
5	16 5	4	Ammonia Extract of Ergot	0 1 mg	1 0	50	Very strong
6	15 0	3	Acetone Extract of Ergot	0 1 mg	1 5	15	Fair
7	13 5	4	Ether Extract of Ergot	0 1 mg	1 5	25	Fair
8	17 0	4	Ethylene Dichloride Extract of Ergot	0 1 mg	2 0	30	Strong
9	9 2	3	Sulphur Dioxide Extract of Ergot	0 1 mg	1 0	50	Very strong

minutes In doses of 2 cc per Kg (equivalent to 0 5 mg per Kg of ergotamine as determined by the Reversal Uteri Method or the U S P Cock's Comb Method) the time of onset of action with the liquid extract B P 1914 is about ten to twenty minutes As shown in Table III, the various extracts of ergot (ammonia, acetone, ether, ethylene dichloride and sulphur dioxide) in doses of 0 1 mg to 1 mg per Kg (equivalent to ergotamine as determined by the Reversal Uteri and U S P







Cock's Comb Methods) produce definite response of action by mouth in four minutes to fifteen minutes Thus, by mouth, the fluidextract of ergot U S P, liquid extract of ergot B P 1914, or the various extracts of ergot as shown in Table III, have approximately the same time of onset of action on the puerperal uteri of dogs

As shown in Table III, with ergotamine in doses of 0 4 mg to 1 mg per Kg the time of definite response is forty to fifty minutes In doses of 0 5 mg to 1 mg per Kg with ergotoxine definite action is shown in thirty to sixty minutes Thus, both ergotamine or ergotoxine have a more prolonged definite onset of response on the puerperal uteri of dogs than that of the fluidextract of ergot U S P, liquid extract of ergot B P 1914 or the extracts of ergot (ammonia, acetone, ether, ethylene dichloride and sulphur dioxide)

TABLE III —PUERPERAL UTERI OF DOGS, ORAL ADMINISTRATION

Number of Dog	Body Weight Kg	Number of Days Post partum	Drug	Dose in Cc or Mg per Kg Cc	Time of Onset of Doubtful Response Minutes	Time of Onset of Definite Response Minutes	Duration of Action Minutes	Remarks Contractions
10	19 4	4		0 2		8	40	Weak
11	7 1	3		0 5		12	30	Strong
12	12 3	3		0 65	5	10	90	Powerful
13	14 1	6	Fluidextract	0 70	4	20	40	Strong
14	8 0	5	Ergot U S P	1 00	4	8	60	Strong
15	12 0	4		1 00	10	15	70	Strong
16	11 9	4		1 00		10	50	Strong
17	14 8	4		1 00	6	12	100	Strong
18	10 0	4		1 00	None	None	None	No response
19	24 0	3	Liquid Extract	2 00		10	60	Strong
20	11 6	3	of Ergot B P	2 00	10	14	120	Strong
21	8 4	4	1914	2 00	10	20	50	Strong
22	15 0	4		2 00	9	16	40	Strong
23	16 8	3		0 10	None	None	None	No response
24	11 0	5		0 20	None	None	None	No response
25	11 0	4		0 20		50	30	Weak
26	5 0	4	Ergotamine Tar-	0 40		40	50	Weak
27	8 0	3	trate	0 50		60	40	Weak
28	8 1	3		0 60		45	70	Strong
29	8 1	4		1 00	10	48	60	Strong
30	10 0	5		1 00		55	50	Strong
31	12 7	3		0 20	None	None	None	No response
32	3 9	6		0 50		40	30	Weak
33	11 7	5		0 50		60	30	Weak
34	12 5	4	Ergotoxine	0 50		50	30	Strong
35	18 4	6	Ethanesul-	1 00	25	30	60	Powerful
36	8 2	5	phonate	1 00		40	30	Strong
37	10 2	4		1 00		30	40	Strong
38	13 0	3		1 00		50	50	Strong
39	22 4	4		1 00		40	120	Powerful
40	14 6	4		0 07	None	None	None	No action
41	13 4	5		0 08	None	None	None	No action
42	14 0	4		0 10		4	30	Weak
43	10 5	4		0 10		8	40	Strong

TABLE II —*Continued*

44	12 6	5	Ammonia Extract of Ergot	0 15	None	None	None	Leak in system
45	15 6	4		0 20		5	40	Strong
46	15 2	4		0 20	None	None	None	Leak in system
47	8 6	4		0 20	10	13	60	Strong
48	8 6	3		0 25		10	30	Strong
49	14 2	4		0 50		8	50	Powerful
50	16 5	5		0 50		10	50	Powerful
51	9 5	4		0 60	5	15	60	Powerful
52	13 5	4		1 00		9	30	Powerful
53	14 0	4	Acetone Extract of Ergot	1 00	5	10	35	Fair
54	11 5	3	Ether Extract of Ergot	1 00	8	13	45	Fair
55	10 0	3	Ethylene Dichloride Extract of Ergot	1 00	10	14	40	Strong
56	13 0	4		1 00	10	12	30	Fair
57	8 7	3		1 00	9	15	120+	Powerful
58	10 6	3	Sulphur Dioxide Extract of Ergot	1 00	3	4	30	Strong
59	12 4	3		1 00	3	4	40	Strong
60	8 9	4		1 00	3	5	60+	Powerful

CONCLUSIONS

1 As a pharmacological method the intact puerperal uteri of dogs is helpful in the study of the active principles of ergot

2 On the puerperal uterus the fluidextract of ergot U S P, liquid extract of ergot B P 1914 and the various extracts by mouth show a more rapid onset of definite contractions than that of the alkaloids, ergotamine or ergotoxine

3 Ergot contains a principle (not ergotamine or ergotoxine) that produces by mouth a rapid onset of action on the puerperal uterus of dogs

REFERENCES

(1) F H Carr and G Barger, 'Note on Ergot Alkaloids" *Chem News*, 94 (1906), 89

(2) A Stoll, "Zur Kenntnis der Mutterkornalkaloid," *Verhandl Schweiz Naturl Gesell sch* (1920), 190

(3) K Spiro and A Stoll, ' Ueber die wirksamen Substanzen des Mutterkorns" *Schweiz med Wochschr*, 2 (1921), 525

(4) A Stoll, "Über Mutterkorn" *Schweiz Apoth -Ztg*, Nos 26–28 (1922)

(5) C Moir, "Clinical Comparison of Ergotoxine and Ergotamine," *Brit Med J*, 1 (1932), 1022

(6) C Moir, "The Action of Ergot Preparations on the Puerperal Uterus," *Ibid*, 1 (1932) 1119

LILLY RESEARCH LABORATORIES,
INDIANAPOLIS IND

DIGITALIS GLYCOSIDES E Leger (*J pharm chim, Paris*, 18 (1933), 482) This review of the work of many authors upon the digitalis glycosides shows that although these glycosides differ, especially with respect to the number and nature of the sugar molecules with which the aglycones are associated, there is a close relationship between the aglycones themselves The knowledge of the constitution of one of these aglycones would furnish the key to the constitution of the remainder —G M MELHUISH in *Quarterly Journal of Pharmacy and Pharmacology* 7 (1934), 127

PRELIMINARY REPORT UPON CHEMICAL EXAMINATION OF THE ENTIRE PLANT OF CELASTRUS SCANDENS *

BY NELLIE WAKEMAN

(WITH CARL BUHLER, HARVEY KIMBEL, ALBERT NIEBAUR, ANDREW RUZEK AND VINCENT WASZ)

The entire plant was collected in the fall and separated into leaves, fruit, bark, wood and root, each of the five students being given a part for investigation The work, though still in the preliminary stages, has yielded extremely interesting products

The general plan followed in this examination was to dry the plant material, reduce it to powder, and then extract it by continuous percolation with petroleum ether, ether and alcohol successively Moisture determinations of both fresh and dried material, and ash determinations, were made of each plant part

Leaves—The dried and powdered leaves had a beautiful bright green color Both the petroleum ether and the ether extracts from this powder were rich in chlorophyll From these extracts a thick dark oily product resulted Its saponification value is low From it there has been obtained an unsaponifiable residue which is precipitated by digitonin and responds to the color reactions for sterols

From the alcoholic extract of the leaves there has been isolated a small quantity of a white crystalline substance which has a sweetish taste but does not reduce Fehling's solution Upon hydrolysis, however, it has reducing properties This material is difficultly soluble in cold alcohol, much more soluble in hot alcohol, soluble in dilute alcohol, especially when hot, and in water

Stem—The bark of the stems was tough and stringy when dried It could not be ground in a mill, so it was clipped with scissors into pieces about an eighth of an inch long, packed in a percolator and extracted in the same way as the leaves The extracts were somewhat greenish in color though little chlorophyll was extracted As from the leaves, an unsaponifiable substance which responded positively to tests for sterols was obtained, also the same, or a similar, white crystalline substance This melted at 182° Upon hydrolysis no evidence of a non-sugar material was found The hydrolyzed product reduced Fehling's solution and yielded, with phenylhydrazine, an osazone which melted at 190–191° and resembled, in its crystalline form, galactosazone

The wood of the stem also yielded a sterol-like substance and a white crystalline product which was, at first, thought to be identical with that from the leaves and bark, but which refused to hydrolyze and yield a reducing sugar This material resembles in appearance, taste and solubility the hexatomic alcohols, mannitol, dulcitol, sorbitol Its melting point, by repeated crystallizations, was raised to 186°, too high for mannitol or sorbitol but approaching that of dulcitol

Root—The red outer bark of the root was carefully removed with a knife, then ground to powder This powder was packed in a percolator and extracted by continuous percolation with low boiling petroleum ether (Skellysolv B, b p 65°) After extracting for about three hours the heat was removed, and the deep red

* Scientific Section, A PH A, Washington meeting, 1934

petroleum ether extract was allowed to stand over night In the morning beautiful ruby red crystals were found to have separated in the flask These were filtered on a pad of solid carbon dioxide and kept in a sealed tube filled with the gas They melt at 192°, the melting point of β-carotene, and resemble β carotene in solubility and crystalline form Longer extraction with petroleum ether produced more of the red product and, finally, an orange-colored powdery precipitate, which is easily separated from the red crystals by washing with ether

Work upon the woody portion of the root has scarcely begun There is being obtained, however, a sterol-like substance and a white crystalline substance resembling those from the leaves and stem

Fruit—The outer husk was separated from the fruit and it and the berry were dried separately The dried husks were ground in a mill The berries, after drying, were rubbed on a coarse sieve with a large cork, and the arillus was thus separated from the seed The coarse powder thus obtained was of a deep red color It and the powdered husks were extracted separately with low boiling petroleum ether From the deep red extracts no crystals separated upon standing The extracts were then concentrated by distillation of the petroleum ether, and red fatty masses resulted, that from the arillus of the seed being the more intensely colored This product was saponified by boiling with alcoholic potassium hydroxide After the alcohol was evaporated water was added to the reaction mixture and it was shaken out with ether Small deep red needle-shaped crystals separated upon evaporation of the ether Only a small quantity of this material has been obtained Neither it nor the other products of the hydrolysis have been investigated

There have, therefore, been isolated from the plant, and partly identified

One or more substances which respond to the tests for sterols

One or more red crystalline substances which resemble carotene, probably β-carotene

Two or more white crystalline substances, one of which yields upon hydrolysis a reducing sugar which forms an osazone with the melting point and crystalline form of galactosazone The other is non-sugar in character, probably a sugar alcohol, possibly dulcitol

All of these products, and others not so well characterized, are undergoing further examination and will be reported upon later

LABORATORY OF PLANT AND PHARMACEUTICAL CHEMISTRY,
THE UNIVERSITY OF WISCONSIN,
MADISON, WISCONSIN

SOME OBSERVATIONS ON THE STABILITY OF QUININE SULPHATE DURING STORAGE *

BY L E WARREN [1]

Under certain conditions quinine sulphate may crystallize from water with 8 molecules of water of hydration This product rapidly loses some of its water,

* Scientific Section A PH A, Washington meeting, 1934

[1] Food and Drug Administration, Washington D C

even while drying during the process of manufacture, so that the more usual form contains moisture, equivalent to about 7 or $7^1/_2$ molecules of water It has been known for many years that quinine sulphate containing more than 2 molecules of water of hydration is unstable On standing at ordinary temperatures the salt loses water until the equivalent of only about two molecules remain This change takes place very rapidly at 50° C After the two-molecule stage has been reached the product remains stable unless subjected to temperatures appreciably higher than those usual in the laboratory or to other unusual treatment, such as storage in a desiccator

The U S Pharmacopœia permits either 7 or 8 molecules of water of hydration It prescribes a maximum limit for loss on drying (16 2 per cent) which is very nearly the value corresponding to 8 molecules of water of hydration (16 16 per cent) It prescribes no minimum limit for loss on drying Concerning the instability of the fully hydrated salt the U S P X makes the following statement

"It effloresces rapidly when exposed to dry air or when heated to 50° C , losing all but two *molecules of its water of crystallization and becoming lusterless* '

Although there are several references in the literature to the instability of quinine sulphate during storage, exact information concerning the length of time required (at room temperature) for the crystallized salt to lose sufficient of its water to reach the stable form is inadequate

In 1876 Cownley[1] observed that freshly prepared quinine sulphate contained $7^1/_2$ molecules of water of crystallization and that it lost $5^1/_2$ of these when freely exposed to the air for 28 hours

In 1884 Parsons[2] reported that he had determined the water in 1015 samples of quinine sulphate by drying in a water oven The average water content was 13 849% or slightly above $6^1/_2$ molecules (13 56 %) He suggested that the stable salt with 2 molecules of water of crystallization be introduced in the U S P VII

In 1886 Spalding[3] reported that he had weighed the contents of two cans of quinine sulphate and repeated the weighings over a period of 12 months in one instance and 8 months in the other The total loss in the first case amounted to between 8% and 9% and in the second to 11 39% No information was given as to how long the containers remained open at the time of the weighings

In 1892 Thompson[4] reported that he had found an average water content of 11 74% in 183 samples of quinine sulphate on the market

In 1924 Linerseege[5] called attention to this problem in its relation to public analysts in Great Britain He says in part

Owing to some samples of medicine containing an excess of quinine, seven samples of the sulphate were bought from pharmacies The amount of moisture varied from 3 7 per cent to 12 0 per cent, with an average of 6 4 per cent not one of them corresponding with the $7^1/_2$ molecules or 15 3 per cent of water required by the B P description The 1898 B P required the freshly

---

[1] 'The Water of Crystallization in Quinine Sulphate ' *Pharm J & Trans* (3) 7 (1876), 189

On the Water of Hydration in Quinine Sulphate " Proc A Ph A , 32 (1884), 457

[3] 'Sulphate of Quinine—Loss in Weight when Packed in Cans ' *Ibid* , 34 (1886), 605

[4] Quinine Sulphate U S P ' *Ibid* , 40 (1892) 266

[5] ' Quinine Sulphate ' Year Book of Pharmacy," 61 (1924) 756

prepared salt to lose 15 2 per cent of moisture on heating This test was omitted in the 1914 B P , and nothing put in its place Both Pharmacopœias remark under "Characters and Tests" that the crystals effloresce on exposure to dry air until two molecules of water remain What, therefore, is the amount of moisture in the B P salt? Is it $7^1/_2$ molecules, as required by the description, or anything between that and two molecules, as is suggested by the latter statement? This is a difficult question for an analyst who receives samples of quinine sulphate or medicine containing it The retail samples given above show how variable the salt is, and one wholesale sample contained 3 9 per cent of moisture

Linerseege suggested that the next revision of the British Pharmacopœia should describe a salt containing but two molecules of water of crystallization However, the new edition (1930) still describes a salt with $7^1/_2$ molecules of crystallization

Two one-ounce bottles of quinine sulphate of the same brand were obtained by Sage[1] from the manufacturer One was opened immediately and small portions were removed from time to time for a period of two years The other was kept sealed beside the opened bottle Water was then determined in each The salt from the frequently opened bottle lost 3 76% on drying and the other 13 28% The initial moisture content of the salt in the first opened bottle was not stated

In 1933 Beal and Szalkowski[2] determined loss in weight at 100° on twenty-eight specimens of quinine sulphate, representing market material A specimen containing 16 78% of H_2O and an anhydrous specimen were prepared The market material lost from 4 39% to 12 29%, or calculated as H_2O, from 1 9 to 5 8 molecules None of the market specimens conformed to the U S P which limits the loss at 100° to 16 2% Portions of both of the prepared specimens were exposed in desiccators 14 days to concentrated sulphuric acid, 3 1 sulphuric acid, 2 1 sulphuric acid, 1 1 sulphuric acid, saturated solution of potassium acetate (20% humidity), saturated solution of calcium chloride (30% humidity), saturated solution of potassium carbonate (40% humidity) and saturated solution of ammonium chloride (80% humidity) No marked changes took place after the ninth day The dihydrate (4 60% H_2O) is the most stable form The heptahydrate (14 43%), the octahydrate (16 16%) and the anhydrous salt tend to form the dihydrate In changing from the heptahydrate to the dihydrate the salt loses its long, flaky crystalline form which results in short needles that have almost the appearance of fine powder The salt also loses in bulk

Wales[3] has shown by vapor pressure measurements that two hydrates of quinine sulphate exist The octahydrate is unstable under exposure to the air and is transformed into the dihydrate His findings indicated that under ordinary conditions equilibrium with water vapor in the air would be reached somewhere on the sharp break in the vapor pressure curve and that the salt stored in an open container should contain slightly more than 2 moles of water

Because of the insufficiency of the information in the literature, and because of the bearing which the facts would have on the administration of the food and drugs act it was decided to carry out some tests in the hope of determining how rapidly the salt would lose its water under such conditions as would ordinarily obtain on

---

[1] "Quinine Sulphate and Its Storage" *Pharm J* 119 (1927) 264

[2] 'Notes on the Water of Crystallization of Quinine Sulphate" Jour A Ph A , 22 (1933) 1219–1225

[3] *Ibid* , 23 (1934) 793

the shelves of drug stores Accordingly, in November 1932, seven packages of quinine sulphate were purchased directly from the manufacturer with the specifications that the material should all be of the same lot and that it should have been freshly made and packed The material was contained in six glass bottles with screw caps, each containing 1 ounce, and in one 8-ounce tin with tightly fitting telescopic cover The salt in the tin package was protected further by being placed in a sack of blue paper

The following disposition was made of the material

A 1-ounce package (A) was opened in the Washington Laboratory immediately after delivery and a small portion taken out for water determination,[1] the package being kept open for 15 minutes This procedure was repeated once each week until the material no longer lost weight, care being taken to keep the package open for exactly 15 minutes each time a portion was taken out for analysis, and to take the sample from the surface of the contents without mixing the remainder This was assumed to simulate conditions in prescription practice

The 8-ounce package (B) was given the same treatment as the 1-ounce package above mentioned

After an interval of 1 month another package (C), which had been kept sealed in the laboratory since purchasing, was opened and a sample taken for water determination, the container being kept open for 15 minutes This procedure was repeated once each month until the material ceased to lose weight

After an interval of 3 months a fourth package (D) (still sealed) was opened and a sample removed once each month for water determination, the package being left open for 15 minutes each time that a sample was removed The process was repeated until the loss became constant

After an interval of 4 months a fifth package (E) (still sealed) was opened and a sample removed for water determination once each month until the weight became approximately constant

One of the 1-ounce packages (F) was sent unopened to the Minneapolis Station of the Food and Drug Administration, and another (G) to the Denver Station with the request that they be opened once each week for 8 weeks and kept uncovered for 15 minutes each time The request was made also that the product be stored in such manner that direct sunlight would not fall on it As soon as the specimens had been returned they were opened and the treatment accorded the third specimen given each

Since all of the specimens were of the same lot it was assumed that the initial water content of all of the 1-ounce packages was the same as that of the two specimens which were first assayed

At the expiration of one year from the time of purchase all of the specimens were reexamined for loss on drying Also at the expiration of one year from the time of opening each specimen was again tested for loss on drying

The results obtained with the specimens which were analyzed weekly are recorded in Table I, those obtained from the analyses on the monthly basis are given in Table II The monthly results for Specimens A and B are included also in Table II, four weeks being considered as 1 month

[1] Water was determined by drying at 90° C

In Table III the principal results are condensed for ready reference

TABLE I —WATER CONTENT OF QUININE SULPHATE AFTER STORAGE FOR DIFFERENT PERIODS

Sample	Initial Water Content Per Cent	Water Content after 1 Week Per Cent	Water Content after 2 Weeks Per cent	Water Content after 3 Weeks Per Cent	Water Content after 4 Weeks Per Cent	Water Content after 5 Weeks Per Cent	Water Content after 6 Weeks Per Cent	Water Content after 7 Weeks Per Cent	Water Content after 8 Weeks Per Cent	Water Content after 9 Weeks Per Cent
A	12 91 12 91 13 18	12 97 12 91	12 58	11 63	8 93	7 77	9 18 8 35	7 94	6 98	6 65
B	13 48 13 44	12 75 12 44	11 27	10 25	9 56	7 86	6 92	5 81	6 40	6 97

Sample	Initial Water Content Per Cent	Water Content after 10 Weeks Per Cent	Water Content after 11 Weeks Per Cent	Water Content after 12 Weeks Per Cent	Water Content after 13 Weeks Per Cent	Water Content after 14 Weeks Per Cent	Water Content after 15 Weeks Per Cent	Water Content after 16 Weeks Per Cent	Water Content after 7 Mos. Per Cent
A	12 91 12 91 13 18	5 57	5 27	4 63	No assay	No assay	No assay	No assay	No assay
B	13 48 13 44	6 83	5 41	5 37	5 03	5 06	4 84	5 00	4 50

TABLE II —WATER CONTENT OF QUININE SULPHATE AFTER STORAGE FOR DIFFERENT PERIODS

Sample	Initial Water Content Per Cent	Water Content after 1 Mo Per Cent	Water Content after 2 Mos Per Cent	Water Content after 3 Mos Per Cent	Water Content after 4 Mos Per Cent	Water Content after 5 Mos Per Cent	Water Content after 6 Mos Per Cent	Water Content after 7 Mos Per Cent	Water Content after 8 Mos Per Cent
A	12 91 12 91 13 18	8 93*	6 98*	4 63*	No assay	4 56	No assay	No assay	No assay
B	13 48 13 44	9 56*	6 40*	5 37*	5 00*	4 86	No assay	4 50	No assay
C		13 53** 13 00	12 65 11 84	8 70 8 45	6 95	4 56	4 68	4 62	No assay
D				12 09** 11 88	10 33	8 51	7 78	7 36	6 80
E					11 25** 11 21	9 78	8 95	8 56	7 4
F			12 10** 12 09	11 54 11 53	10 42	9 38	8 07	6 84	6 58
G			13 27** 11 25	9 13 9 06	8 78 8 20	9 51	7 94	6 99	No assay

Sample	Initial Water Content Per Cent	Water Content after 9 Mos Per Cent	Water Content after 10 Mos Per Cent	Water Content after 11 Mos Per Cent	Water Content after 12 Mos Per Cent	Theory for $Q_2SO_4\,2H_2O$ Per Cent
A	12 91 12 91 13 18	No assay	No assay	No assay	4 84	4 60
B	13 48 13 44	No assay	No assay	No assay	4 51	4 60
C		No assay	No assay	No assay	4 67	4 60
D		7 21	6 37	5 64	4 66	4 60
E		7 81	5 25	4 65	4 84	4 60
F		6 90	No assay	6 60	4 61	4 60
G		No assay	No assay	6 17	4 87	4 60

* Four weeks was considered as a month in these assays
** Initial assay

The results in Table I show that Specimen A became stable in 12 weeks and Specimen B in 7 months The stable stage was reached when the product contained approximately 4 60 per cent of water, or two molecules Specimen C contained 13 27 per cent of water after storage for one month unopened It became stable in 4 months after opening, or 5 months after purchase Specimen D contained 11 98 per cent of water after storage unopened for 3 months It became stable in 9 months after opening, or 12 months after beginning storage Specimen E contained 11 23 per cent of water on first opening 4 months after purchase It became stable in 7 months after opening or 11 months after purchase The specimens which were not opened until 1, 3 or 4 months after purchase contained nearly

as much water (initial analysis) as the specimens opened and assayed immediately after purchase The specimen which had been opened weekly in Minneapolis for 8 weeks (but not analyzed there) (F) contained 12 1 per cent of water after its return to the Washington laboratory, or nearly 6 molecules After monthly opening and sampling in Washington it became stable in 10 months after opening, or 1 year after purchase Likewise, the specimen which had been opened in Denver (G) contained 12 26 per cent of water (or nearly 6 molecules) after its return to Washington It became stable in 12 months after opening or 14 months after purchase

TABLE III —WATER CONTENT OF QUININE SULPHATE AFTER STORAGE FOR DIFFERENT PERIODS

Sample	Treatment before Initial Analysis	Water Content Initial Analysis Per Cent	Water Content 1 Mo after Opening Per Cent	Water Content 2 Mos after Opening Per Cent	Water Content 4 Mos after Opening Per Cent	Water Content 6 Mos after Opening Per Cent	Water Content 8 Mos after Opening Per Cent	Water Content 12 Mos after Opening Per Cent
A	Opened immediately	12 91 12 91 13 18	8 93	6 98	No assay	No assay	No assay	4 84
B	Opened immediately	13 48 13 41	9 56	6 40	5 00	No assay	No assay	4 51
C	Stored 1 month after purchase	13 53 13 00	12 65 11 84	8 70 8 45	4 56	4 62	No assay	4 67
D	Stored 3 months after purchase	12 09 11 88	10 33	8 91	7 36	7 21	6 80	4 86
E	Stored 4 months after purchase	11 25 11 21	9 78	8 95	7 44	7 44	5 25	4 58
F	Opened weekly for 2 mos but no samples taken then opened monthly for analysis	12 10 12 09	11 54 11 53	10 42	8 07	6 58	No assay	4 74
G	Opened weekly for 2 mos but no samples taken then opened monthly for analysis	13 27 11 25	9 13 9 06	8 78 8 20	7 94	No assay	No assay	4 81

These experiments show that during storage in a climate comparable to Washington, D C, crystallized quinine sulphate progressively loses water of crystallization until it contains about 2 molecules (4 60%) after which it remains practically stable The more frequently the specimen is opened the more rapid is the loss Specimens which are opened occasionally but which are not otherwise disturbed, such as the packages sent to Minneapolis and Denver, do not lose their water of crystallization very rapidly The conditions under which Specimens A and B were kept probably represent those obtaining in drug store practice more nearly than is the case with the other specimens

THE HYDRATION OF EMETINE HYDROCHLORIDE AND CODEINE PHOSPHATE *

BY H WALES [1]

I Emetine Hydrochloride —The statement in the tenth edition of the United States Pharmacopœia that emetine hydrochloride "contains variable amounts of water of crystallization" is the obvious conclusion to be drawn from the reports of those who have published data on this product

Paul and Crownley (1) state that considerable difficulty was encountered in obtaining the salt in a state fit for analysis on account of the large quantity of

* Scientific Section, A PH A, Washington meeting 1934

[1] Drug Control, Food and Drug Administration

mother liquor retained by the crystals, and decide that it contains six molecules of water of crystallization Hesse (2) states that emetine hydrochloride crystallizes from water with eight molecules of water of crystallization, that four molecules are easily given up on exposure to the air, and that the anhydrous salt will readily take up $4H_2O$ on exposure to the air He computes the data given by Frerichs and de Fuentis Tapis (3) as showing $4H_2O$ for a commercial sample and $8H_2O$ for one which they obtained by adding ether to an alcoholic solution of the salt Hesse states also that Keller (4) found nearly $4H_2O$ in a commercial sample and $3H_2O$ in one which was obtained by adding ether to an alcoholic solution Carr and Pyman (5) state that emetine hydrochloride recrystallized from water and "dried in air until of practically constant weight retains $7H_2O$" They claim that when recrystallized from methyl alcohol it contains $3^1/_2H_2O$ As indicated by Table I the same lack of consistency is shown in the standards provided by the various pharmacopœias for the water content of emetine hydrochloride However, only three of these pharmacopœias venture to ascribe a definite hydrate to the product The British and Brazilian Pharmacopœias state that it contains $7H_2O$ and the Swiss Pharmacopœia that it contains "about $4H_2O$" Incidentally the formula of $C_{30}H_{44}O_4N_2$ 2HCl given in the Pharmacopœias of the United States and Brazil is not as well authenticated as that of $C_{29}H_{40}O_4N_2$ 2HCl which is used by Netherlands, Great Britian, Switzerland and Denmark (5), (7)

TABLE I —MOISTURE STANDARDS FOR EMETINE HYDROCHLORIDE

	Min	Max
Pharmacopœia of Japan (1919)		15%
United States Pharmacopœia (1925)		19%
Deutsches Arzneibuch (1926)		10%
Nederlandsche Pharmacopee (1926)	10%	14%
Pharmacopœia Brazil (1929)		19%
British Pharmacopœia (1932)	15%	19%
Pharmacopœia Helvetica (1933)	10%	13%
Pharmacopœia Danica (1933)		15%

Coormans (6) calls attention to the variation in water content of emetine hydrochloride as provided by the different European pharmacopœias and finds that samples manufactured in different countries meet the pharmacopœial requirements of the country of manufacture The actual amount of water found in the samples of emetine hydrochloride examined by the several investigators is shown in the following table

TABLE II —WATER CONTENT OF EMETINE HYDROCHLORIDE

	Per Cent	Moles
Paul and Crownley	19 59	7 5
Frerichs and de Fuentis Tapis	12 57	4 4
	19 51	7 4
Keller	10 16	3 5
	8 31	2 8
Hesse	19 91	8 2
	12 73	4 5
	12 54	4 4

TABLE III —VAPOR PRESSURE AT 25° C OF EMETINE HYDROCHLORIDE CONTAINING VARYING AMOUNTS OF WATER

Water in Sample Per Cent	Moles Water in Sample	Vapor Pressure in Mm
28 14	12 0	23 0
26 84	11 3	22 1
25 62	10 8	21 8
24 29	9 9	20 0
22 04	9 1	18 4
19 93	7 6	16 0
18 65	7 0	14 5
17 56	6 6	13 1
16 37	6 0	11 5

TABLE II—*Continued*

Carr and Pyman	17 4	6 5
	19 0	7 3
	18 2	6 9
	18 4	7 0
	17 3	6 5
	19 2	7 3
Coormans	16 34	6 0
	13 0	4 6
	15 0	5 4
	13 9	5 0
	10 25	3 5
	9 5	3 2

TABLE III—*Continued*

15 24	5 5	10 0
12 69	4 5	7 0
10 62	3 7	4 6
8 51	2 8	3 3
6 97	2 3	2 5
4 90	1 6	1 2
3 19	1 0	0 8
0 83	0 3	0 2

The vapor pressure of emetine hydrochloride, progressively dehydrated at 25° C, was determined by the method already described for quinine sulphate (8) As can be readily seen from the accompanying table and curve no evidence of a hydrate is shown The vapor pressure of the solution of water in emetine hydrochloride is so low that the product will be in equilibrium with atmospheric conditions when it contains between 8% and 16% of water This water is, however, merely adsorbed or dissolved in the emetine hydrochloride It does not exist in the form of a hydrate

II Codeine Phosphate—Codeine phosphate is described in the British Pharmacopœia (1932) as containing one molecule of water of crystallization The German (1926), Swiss (1933) and Danish (1933) Pharmacopœias state that it contains one and one-half molecules of water while the United States (1926), Swedish (1925), French (1925) and Brazilian (1929) Pharmacopœias ascribe two molecules of water of crystallization to the product

Anderson (9) reports that codeine phosphate crystallized from water contains approximately $1^1/_2H_2O$ Schmidt (10) states that when crystallized from water it contains $2H_2O$ and from dilute alcohol $^1/_2H_2O$ Beilstein (11) and Tambach and Henke (14) both give the formula with $1^1/_2H_2O$ Schaefer (12) states that "all the preparations on the market contain only $^1/_2$ molecule of water of crystallization The salt with 2 molecules of water exists but it is a practical impossibility to produce it for commercial purposes" Henry (13) states that codeine phosphate contains 1, $1^1/_2$ or $2H_2O$

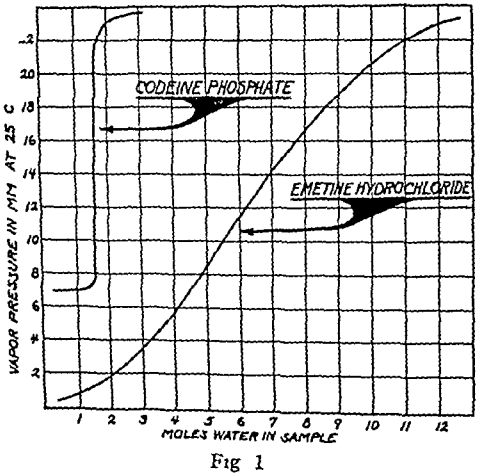


Fig 1

Codeine phosphate progressively dehydrated at 25° C by the method described above gave the following results

As will be seen from the accompanying curve codeine phosphate crystallized

from water at room temperature contains one and one-half molecules of water of crystallization No evidence of any other hydrate is indicated by these results

TABLE IV

Per Cent Water in Sample	Moles Water in Sample	Vapor Pressure in Mm	Per Cent Water in Sample	Moles Water in Sample	Vapor Pressure in Mm
8 15	1 96	23 0	4 56	1 05	7 0
7 61	1 82	21 0	3 71	0 85	7 0
6 80	1 61	18 0	3 20	0 73	6 6
6 57	1 55	9 0	2 96	0 67	7 0
6 22	1 47	7 5	2 07	0 47	6 5
6 06	1 42	7 1	1 49	0 33	6 0
5 53	1 24	7 0	1 18	0 26	5 0
4 84	1 12	7 0			

REFERENCES

(1) Paul and Crownley, *The Pharmaceutical Journal and Transactions*, 25 III (1894), 373
(2) Hesse, *Annalen* 405 (1914), 1
(3) Frerichs and de Fuentis Tapis *Archiv der Pharmazie*, 240 (1902), 390
(4) Keller *Ibid*, 249 (1911) 519
(5) Carr and Pyman, *J Chem Soc* 105 (1914), 1602
(6) Coormans *J pharm Belg* 14 (1932), 389
(7) Pyman and Brindley *Chem and Ind*, 46 (1927), 356
(8) Wales, JOUR A PH A, 23 (1934) 793
(9) Anderson, *Annalen* 77 (1851), 353
(10) Schmidt, *Apoth Ztg*, 5 (1890) 366 through *Am J Pharm* 62 (1890), 444
(11) Beilstein, Organische Chemie ' 3 902 (1897 Edition)
(12) Schaefer, *Am J Pharm* 82 (1910) 220
(13) Henry, 'Plant Alkaloids (1924) 263
(14) Tambach and Henke *Pharm Zentralhalle*, 38 (1897), 159, through *Chem Central blatt* 68 (1897) 947

THE BIOASSAY OF THE ANTERIOR PITUITARY-LIKE SEX HORMONE (ANTUITRIN S) *

BY L W ROWE, A SIMOND AND W O NELSON

Although several bioassay methods for evaluating the anterior pituitary-like sex hormone from pregnancy urine have been suggested, none of them has been subjected to adequate critical scrutiny for accuracy nor has there been much basis for a comparison of values obtained by different methods It will be the purpose of this article to present in detail the method which has been used to control accurately the potency of a commercial product (Antuitrin S) as well as to give data comparing activities obtained in the assay of the same preparation by several other recognized methods

Zondek and Aschheim (1) suggested the use of baby female white mice weighing 6 to 8 Gm , for assaying anterior pituitary sex hormone preparations

In 1931, Fevold, Hisaw and Leonard (2) published a method for the assay of the anterior pituitary sex hormone using immature female white rats 20 to 25 days old as the test animals Later, Fevold, *et al* (3) used 21- to 23-day old rats and the same technique but they also reported that rabbits 12 weeks old were even more

* Scientific Section A PH A Washington meeting 1934

satisfactory, as they were not so susceptible to small amounts of luteinizing hormone as are rats and, consequently, differentiated better between the follicle-stimulating and the luteinizing action

Wallen-Lawrence and Van Dyke (4) utilized an assay method in which increase in size of the ovaries or seminal vesicles of immature rats is critically determined

Katzman and Doisy (5) suggest the use of 19 day old female white mice in which a dose given subcutaneously in six equal portions during the course of three days will cause opening of the vagina and *estrus* on the 22nd to the 24th day of age, as judged by vaginal smears, if the dose used contains one or more mouse units They also used 21-day old rats in which case one rat unit must produce these reactions by the 27th day of age

Friedman (6) has studied the effect of various agents on ovulation in the rabbit and suggests an assay method for anterior pituitary sex-regulating activity utilizing this physiological response

Friedman raised the objection to the rat method that rats reach sexual maturity normally at such a variable age that the ovaries of 3-week-old rats will be in such a widely scattered state of development that the same dose of an effective agent could not bring all of them into maturity at the same time Some attempt has been made recently by Davy (7) to overcome this objection by roughly standardizing the normal uninjected female rats She found that those animals which weighed between 35 and 45 Gm at 24 days of age possessed remarkably uniform ovaries, and drew the conclusion that at least one of three such rats may be expected to give a positive response to one M E D of gonadotropic substance injected in 5 daily doses This will be commented upon further a little later

Mention might also be made of the contribution by Swezy (8) in which she voices criticism of practically all the assay methods that have thus far been proposed Nothing of a constructive nature is offered

EXPERIMENTAL

In the early work in this laboratory thirty-day old female white rats, taken from a colony the members of which showed an average sexual maturity age of 50 to 60 days, were used for the potency control of experimental extracts containing the sex-regulating activity of the anterior pituitary as found in pregnancy urine The unknown solution was tested usually at five levels using only two rats at each level It was soon realized, however, that a method utilizing a relatively small number of animals is of qualitative value only but does not meet the rigid requirements of a commercial assay method It was also found that more accurate results could be obtained with the use of rats twenty-six days of age The details of our present method are as follows

Immature female white rats *26 days* old at the beginning of the test, from a colony with an average normal sexual maturity age of 55 days, are dosed subcutaneously twice a day for thee days and autopsy done 96 to 100 hours after the first dose At least *5 rats* and *usually 10* are used at each dosage level and a majority (6 out of 10) must show the definite development of one or more corpora lutea for the test to be positive at this level The weight of the rats and the condition of the vagina and uterus is also carefully noted at the end of the test but the real criterion is the formation of corpora lutea on the ovaries for we have often

found corpora lutea without the vagina being open and sometimes vice versa Usually four levels of dosage varying 10% to 20% with each other are selected and the smallest dose determined which meets the rigid requirements of the test A typical protocol is given herewith in detail

TABLE I

Antuitrin S, R 849774

Age.	Dose	Dil	Total Volume	Wt 30 Da	Corpora Lutea	Vagina and Uterus		Rat U
26 days	0 83 cc × 6	1–500	0 01 cc	40 Gm	2	Open	Congested	100
				42 Gm	2	Closed	Congested	100
				48 Gm	6	Open		100
				44 Gm	3	Open		100
				50 Gm	7	Open		100
	0 67 cc × 6		0 008 cc	48 Gm	4	Open		125
				50 Gm	4	Open		125
				50 Gm	4	Open		125
				50 Gm	5	Open		125
				40 Gm	2	Closed	Congested	125
				40 Gm	3	Closed	Congested	125
				40 Gm	4	Open	Congested	125
				50 Gm	0	Closed	Congested	125
				50 Gm	4	Open		125
				44 Gm	1	Closed	Congested	125
	0 55 cc × 6		0 006 cc	50 Gm	5	Open		150
				48 Gm	2	Closed	Congested	150
				50 Gm	3	Open	Congested	150
				44 Gm	3	Open	Congested	150
				40 Gm	2	Closed	Congested	150
				48 Gm	6	Open		150
				48 Gm	3	Open	Congested	150
				38 Gm	2	Closed	Congested	150
				40 Gm	3	Open	Congested	150
				50 Gm	0	Closed	Congested	150
	0 47 cc × 6		0 0057 cc	48 Gm	0	Closed	Congested	175
				46 Gm	2	Closed	Congested	175
				40 Gm	1	Closed	Congested	175
				40 Gm	2	Closed	Congested	175
				50 Gm	6	Open	Congested	175
				50 Gm	0	Closed	Congested	175
				34 Gm	0	Closed	Congested	175
				46 Gm	2	Open	Congested	175
				50 Gm	3	Open	Congested	175
				50 Gm	0	Closed	Congested	175
	0 42 cc × 6		0 0050 cc	50 Gm	0	Closed	Congested	200
				48 Gm	0	Closed	Congested	200
				50 Gm	0	Closed	Congested	200
				50 Gm	0	Closed	Congested	200
				44 Gm	0	Closed	Congested	200

Activity is 175 rat units per cc (6 out of 10 positive)

In addition to the successful quantitative use of the method outlined in the assay of almost 1000 samples both experimental and commercial, we have conducted a rather intensive study of the stability of a particular experimental lot,

℞ 095286-B, and also of its activity by several methods By our regular method using immature rats this lot has been tested as follows

TABLE II

1	May 2, 1933	175 rat units per cc	
2	May 9, 1933	175	5 weeks old
3	June 6, 1933	150	9 weeks old
4	July 6 1933	150	14 weeks old
5	Aug 8, 1933	125	17 weeks old
6	Aug 29 1933	75	20 weeks old
7	Sept 19, 1933	75	24 weeks old
8	Oct 17, 1933	75	

Careful tests on this lot in September 1933 upon baby mice for results comparable to the Zondek and Doisy mouse units gave data as follow

TABLE III

℞ 095286 B Female, 15 to 18-day old mice

Weight 9/26	Weight 9/30	Dose	Dil.	Total Volume.	Smear Stage	Corpora Lutea	Vagina and Uterus		Rat Units
9 Gm	12 Gm	0 6 cc × 6	1–30	0 12 cc	5	2	Open		8
7 Gm	11 Gm				4	3	Open		
8 Gm	11 Gm				2	2	Open	Congested	
8 Gm	11 Gm				2	1	Open	Congested	
8 Gm	11 Gm				4	1	Open	Congested	
6 Gm	9 Gm				2	0	Open	Congested	
8 Gm	7 Gm				–				
8 Gm	Died				–				
6 Gm	Died				5	2	Open		
10 Gm	14 Gm								
Male									12
6 Gm	7 Gm	0 4 cc × 6		0 08 cc	5	1	Open		
8 Gm	10 Gm				3	5	Open	Congested	
7 Gm	11 Gm				2	2	Open	Congested	
8 Gm	12 Gm				–	0	Closed		
8 Gm	10 Gm				5	1	Open	Congested	
8 Gm	7 Gm				1–2	4	Open	Congested	
7 Gm	9 Gm				1–2	1	Open	Congested	
6 Gm	6 Gm				1–2	0	Open	Congested	
8 Gm	10 Gm				2	1	Open	Congested	
8 Gm	Died								
8 Gm	10 Gm	0 33 cc × 6		0 066 cc	2	1	Open	Congested	15
6 Gm	Died								
10 Gm	11 Gm				2	2	Open	Congested	
8 Gm	10 Gm				1–2	2	Open	Congested	
7 Gm	9 Gm				2	2	Open	Congested	
7 Gm	9 Gm				2	0	Open	Congested	
9 Gm	13 Gm				1–2	4	Open	Congested	
6 Gm	9 Gm				4	0	Open		
7 Gm	10 Gm				1–2	1	Open	Congested	
7 Gm	Died								
8 Gm	11 Gm	0 25 cc × 6		0 05 cc	1–2	2	Open	Congested	20
8 Gm	12 Gm					0	Closed	Congested	
8 Gm	12 Gm					0	Closed	Congested	
7 Gm	8 Gm				1–2	2	Open	Congested	
9 Gm	12 Gm				2	2	Open	Congested	
7 Gm	10 Gm					0	Closed	Congested	

TABLE III —*Continued*

Weight 9/26	Weight 9/30	Dose	Dil	Total Volume	Smear Stage	Corpora Lutea	Vagina and Uterus		Rat Units
8 Gm	12 Gm					1	Closed	Congested	
8 Gm	10 Gm					0	Closed	Congested	
7 Gm	Died								
8 Gm	12 Gm				2	2	Open	Congested	
10 Gm	12 Gm	0 16 cc × 6		0 032 cc	4?	0	Open	Congested	30
6 Gm	8 Gm					0	Closed	Congested	
8 Gm	12 Gm				1–2	2	Open	Congested	
8 Gm	14 Gm					0	Closed	Congested	
7 Gm	12 Gm					0	Closed		
8 Gm	12 Gm				1–2	2	Open	Congested	
6 Gm	10 Gm					0	Closed	Congested	
8 Gm	12 Gm					0	Closed	Congested	
6 Gm	9 Gm					0	Closed	Congested	
8 Gm	14 Gm				2	1	Open	Congested	

Five out of 9 were positive at 20 units per cc and only 3 out of 10 were positive at 30 units, so 20 mouse units per cc is the activity of ℞ 095286-B Since this lot assayed 75 and 80 rat units per cc after August 8, 1933, 1 mouse unit is approximately equal to 4 rat units

A very recent check test on baby mice at the two critical levels of comparison resulted as follows

TABLE IV

℞ 095286 B Assaying 80 R U /cc

Female white mice approx 16 days old

Weight 10/27	Weight 10/21	Dose	Dil	Total Volume	Corpora Lutea	Vagina and Uterus		Mouse Units	Ratio R U M U
8 Gm	10 Gm	0 33 cc × 6	1–30	0 066 cc	1	Closed	Congested	15	1 5
8 Gm	11 Gm				0	Closed	No effect	15	1 5
7 Gm	8 Gm				2	Closed	Congested	15	1 5
7 Gm	8 Gm				0	Closed	Congested	15	1 5
9 Gm	10 Gm				2	Closed	Congested	15	1 5
9 Gm	11 Gm				2	Closed	Congested	15	1 5
7 Gm	9 Gm				2	Closed	Congested	15	1 5
8 Gm	11 Gm				1	Closed	Congested	15	1 5
8 Gm	8 Gm				1	Closed	Congested	15	1 5
7 Gm	8 Gm				0	Closed	No effect	15	1 5
7 Gm	9 Gm	0 25 cc × 6		0 050 cc	0	Closed	No effect	20	1 4
7 Gm	8 Gm				0	Closed	No effect	20	1 4
8 Gm	10 Gm				0	Closed	No effect	20	1 4
8 Gm	10 Gm				2	Open	Congested	20	1 4
9 Gm	11 Gm				1	Closed	Congested	20	1 4
10 Gm	12 Gm				2	Closed	Congested	20	1 4
8 Gm	10 Gm				1	Closed	Congested	20	1 4
8 Gm	9 Gm				0	Closed	No effect	20	1 4

70% were positive at 15 rat units per cc or 1 mouse unit = 5 rat units
50% were positive at 20 rat units per cc or 1 mouse unit = 4 rat units

Only one mouse was positive out of 18 by the Katzman-Doisy technique and that was with the smaller dose of the two

Some preliminary work on mice a year previously showed that at 5 and 6 rat units per mouse unit only 50% of the mice were positive but this later relationship is more convincing and probably more nearly correct

This lot was also tested on 21-day old white rats with observation of vaginal smears at the end of the fourth day after the first injection in order to conform closely to the Katzman-Doisy technique for the purpose of comparing our unit with their rat unit Results of this test are given in Table V

TABLE V

B 095286 B (21 day old rats Katzman Doisy technique)

Weight Before	Weight After	Dose	Dil	Total Volume	Smear Stage	Corpora Lutea	Vagina and Uterus		Rat Units
35 Gm	47 Gm	0 8 cc × 6	1–100	0 048 cc	2	2	Open	Congested	20
32 Gm	40 Gm				3	2	Open	Congested	
25 Gm	35 Gm				3	3	Open	Congested	
30 Gm	38 Gm				2	1	Open	Congested	
20 Gm	Died								
35 Gm	38 Gm	0 4 cc × 6		0 024 cc	2	2	Open		40
36 Gm	42 Gm				2	3	Open		
28 Gm	30 Gm					0	Closed	Congested	
30 Gm	35 Gm				3	0	Open	Congested	
30 Gm	40 Gm					3	Closed	Congested	
28 Gm	30 Gm				2	3	Open	Congested	
30 Gm	40 Gm				2	2	Open	Congested	
30 Gm	38 Gm				3	2	Open	Congested	
28 Gm	38 Gm				3	3	Open	Congested	
25 Gm	38 Gm				2	2	Open	Congested	
25 Gm	36 Gm	0 8 cc × 6	1–300	0 016 cc	2	2	Open	Congested	60
36 Gm	44 Gm				1–2		Open	Congested	
30 Gm	40 Gm				2	1	Open	Congested	
35 Gm	43 Gm					0	Closed	Congested	
25 Gm	30 Gm					0	Closed	Congested	
30 Gm	40 Gm				1–2	2	Open	Congested	
36 Gm	42 Gm					0	Closed	Congested	
30 Gm	38 Gm				1–2	2	Open	Congested	
25 Gm	33 Gm				1–2	1	Open	Congested	
30 Gm	35 Gm					0	Closed	Congested	
40 Gm	48 Gm	0 6 cc × 6		0 012 cc		0	Closed	Congested	
45 Gm	50 Gm					3	Closed	Congested	
30 Gm	36 Gm					0	Closed	Congested	
40 Gm	50 Gm					0	Closed	Congested	83
34 Gm	36 Gm					4	Closed	Congested	
30 Gm	38 Gm					4	Closed	Congested	
25 Gm	35 Gm					3	Closed	Congested	
25 Gm	33 Gm					1	Closed	Congested	
20 Gm	30 Gm					0	Closed	Congested	
25 Gm	33 Gm					0	Closed	Congested	
47 Gm	55 Gm	0 5 cc × 6		0 010 cc		0	Closed	Congested	100
35 Gm	43 Gm					1	Closed	Congested	
35 Gm	40 Gm					0	Closed	Congested	
25 Gm	33 Gm					0	Closed	Congested	
30 Gm	40 Gm					2	Closed	Congested	

Activity is 60 Doisy rat units per cc

Activity is 60 to 80 Parke, Davis rat units per cc on the 21-day old rats or 75 P D rat units per cc on 26- to 28-day old rats

The Doisy and Parke, Davis rat units are apparently very nearly equal even though the details of the two methods vary materially To prove further that

these two units are about the same and that assays of the same preparation conducted in different laboratories can agree very closely, the following series of tests made in Dr Doisy's and in our laboratories is given in Table VI

TABLE VI

Antuitrin S

Sample No	Our Assay Date	Our Assay Rat Units	Dr Doisy s Assay Date	Dr Doisy s Assay Rat Units
3008439	5/22/33	175	6/14/33	165
3008440	6/10/33	175	6/26/33	167
3009703	6/10/33	175	7/8/33	166
3009702	6/17/33	175	7/8/33	166
3010507	7/1/33	100	7/29/33	75
3013846	7/22/33	150	8/5/33	166
3013847	7/29/33	150	8/10/33	133
3015303	8/5/33	175	8/18/33	166
3016294	8/12/33	100	9/2/33	133
3014538	8/12/33	150	9/2/33	166
3016295	9/19/33	100	9/12/33	85
3016852	8/26/33	175	9/12/33	166
3017466	9/2/33	125	9/18/33	133
3018030	9/2/33	175	9/18/33	166

The agreement in the above assay values obtained in two different laboratories by methods that are not identical is indeed remarkable The slight variations are largely due to differences in selection of dosage levels

THE FRIEDMAN RABBIT OVULATION METHOD

One of us (W O N) has carefully studied the activity of this particular lot of Antuitrin S, ℞ 095286-B, by the Friedman method with results that may be tabulated as follows

TABLE VII

℞ 095286 B Rabbit Ovulation Tests
Estrous Animals Including Postpartum Cases

Weight Kg	Actual Dose per Kg	Result
3 2 pp	0 56 R U	−
3 0	0 60 R U	−
3 0	0 60 R U	−
4 1 pp	0 60 R U	−
3 2 pp	0 60 R U	−
3 95	0 75 R U	−
4 2	0 75 R U	−
4 2 pp	0 75 R U	−
3 6 pp	0 84 R U	−
3 65	0 90 R U	+
2 5	0 90 R U	−
2 5	0 90 R U	−
2 4	0 90 R U	−
4 1	0 90 R U	−
4 1 pp	0 90 R U	+
3 5 pp	0 90 R U	+
3 25 pp	0 90 R U	−
3 85 pp	0 90 R U	+
3 27 pp	0 96 R U	+
3 8	0 96 R U	−
3 7	0 96 R U	+
3 5	0 96 R U	+
3 25 pp	0 96 R U	+
3 3 pp	0 96 R U	+
4 2 pp	0 96 R U	+
3 1	1 002 R U	+
3 5	1 02 R U	+
4 1	1 02 R U	+
3 8	1 05 R U	+
2 5	1 05 R U	+
2 65 pp	1 05 R U	+
3 0	1 05 R U	+
3 5 pp	1 05 R U	+
3 0	1 20 R U	+
2 7	1 20 R U	+
3 1	1 20 R U	+
2 75	1 20 R U	+
3 2	1 20 R U	+
2 5	1 20 R U	+
2 85	1 50 R U	+
2 4	1 80 R U	+
3 1	2,46 R U	+
2 70	3 70 R U	+

pp = postpartum animals
+ = ovulation
− = no ovulation

Actual dose means dose figured on the basis of the assay of 75 R U per cc Assay conducted without knowledge of actual potency

Table VII indicates a slightly greater sensitivity on the part of postpartum animals since at the 0 90 R U per Kg level 3 out of 4 postpartum animals ovulated while only 1 out of 5 of the ordinary isolated females did so, and at 0 96 R U per Kg all 4 of the postpartum animals ovulated while only 2 out of 3 of the others did so Also a few of the animals were used 2 or more times if they did not ovulate with the first dose, but Friedman has demonstrated that such animals are not rendered more susceptible to subsequent doses

TABLE VIII

Non-estrous Rabbits					
Weight Kg	Actual Dose per Kg	Result	2 27	3 0 R U	−
			2 8	3 0 R U	−
			2 8	4 5 R U	−
3 1	1 2 R U	−	2 5	4 5 R U	+
2 4	1 2 R U	−	2 3	6 0 R U	+
2 9	1 2 R U	−	3 2	6 0 R U	+
2 75	1 2 R U	−	2 85	6 0 R U	−
4 1	1 2 R U	−	2 8	6 0 R U	+
2 5	1 8 R U	−	2 4	9 0 R U	+
3 0	3 0 R U	−	2 8	12 0 R U	+
2 2	3 0 R U	−	2 95	12 0 R U	+

These animals were classified as non-estrous because their ovaries contained recent corpora lutea These corpora lutea had been formed by previous Antuitrin-S injections or the injection of some one of the Antuitrin-L extracts However, there was every reason to believe that ovulation might be induced, if the dose of Antuitrin-S were large enough, since fairly large follicles were present in the ovaries along with the corpora lutea

TABLE IX

Young Animals			1 9	9 0 R U	−
Weight Kg	Actual Dose per Kg	Result	1 85	9 0 R U	−
			2 05	12 0 R U	+
1 85	6 0 R U	−	1 90	12 0 R U	+
1 80	6 0 R U	−	2 1	12 0 R U	+

This table gives data on a very limited number of young animals approaching maturity which indicate that about 12 R U per Kg are necessary to induce ovulation

SUMMARY OF RABBIT OVULATION RESULTS

TABLE X

Estrous and Postpartum Animals

Actual Dose Injected per Kg	Number of Cases Positive	Number of Cases Negative
0 56 R U	0	1
0 60 R U	0	4
0 75 R U	0	3
0 84 R U	0	1
0 90 R U	4	5
0 96 R U	6	1
1 002 R U	1	0
1 02 R U	2	0
1 05 R U	5	0
1 20 R U	6	0
1 50 R U	1	0
1 80 R U	1	0
2 46 R U	1	0
3 70 R U	1	0

TABLE XI

Non estrous Animals

Actual Dose Injected per Kg	Number of Cases Positive	Number of Cases Negative
12 R U	0	5
18 R U	0	1
30 R U	0	4
45 R U	1	1
60 R U	3	1
90 R U	1	0
120 R U	2	0

TABLE XII —Young Animals

Actual Dose Injected per Kg	Number of Cases Positive	Number of Cases Negative
60 R U	0	2
90 R U	0	2
120 R U	3	0

In each injection for the induction of ovulation the desired quantity of the extract was taken and made up to 1 cc Injections were given intravenously and the response was determined in 24 to 36 hours by operation or autopsy

DISCUSSION

The tabulated experimental data submitted serve to show the practicability of the proposed method using immature white rats (26 to 28 days old for the control of the sex-regulating activity of the anterior pituitary with an accuracy of 10% to 20% In our opinion the use of rats of this age with autopsy at 96 to 100 hours after the first dose and examination for mature corpora lutea is more definite and practical than the use of younger rats with dependence on the opening of the vagina and upon the estrous stage for a positive reaction, or the use of baby mice where determination of mature corpora lutea is much more difficult

We do find from assays of the same preparations in different laboratories by our corpora lutea method on 26- to 28-day old rats and by the estrous stage method on 21-day old rats (Doisy) that very good agreement in values can be obtained by the two methods

As for the methods using baby white mice, we do not find them any more accurate and certainly they are less practical both because of greater difficulty in interpreting results by gross observation, and also because proper test animals cannot be secured very readily

The rabbit ovulation method appears to be of value and we have provided a basis of comparison between results obtained by it and by the other methods It is to be noted that our results check closely those reported by Dr Friedman However, it does not seem to possess any advantages over the other methods as to accuracy or specificity of the positive reaction and it is more time-consuming and expensive particularly if twenty rabbits are to be used in a test Friedman's objection to the rat methods that different rats reach sexual maturity at such a variable age is taken care of by the use of a number of rats (5 to 10) at each dosage level and by requiring that only a bare majority be positive at the end of the test, for it is admitted that some individual animals are backward in their ovarian development and could not be brought into sexual maturity by the minimum effective dose for the majority

SUMMARY

1 A practical and accurate method is presented for the standardization of the anterior pituitary-like sex hormone from pregnancy urine

2 The relationship between our rat unit and the mouse unit has been shown experimentally to be about 1 mouse unit equivalent to 4 rat units

3 The rabbit ovulation unit was found experimentally to be equivalent to 1 rat unit per Kg body weight of rabbit

BIBLIOGRAPHY

(1) Zondek and Aschheim, *Klinische Woch* 7 (1928), 831–835
(2) Fevold, Hisaw and Leonard *Amer Jour Phys*, 97 (1931), 291–301
(3) Fevold, Hisaw, Heilbaum and Hertz *Ibid* 104 (1933), 710
(4) Wallen-Lawrence and Van Dyke, *Jour Pharm & Exper Ther* 43 (1931) 93
(5) Katzman and Doisy, *Jour Biol Chem* 98 (1932) 739
(6) M H Friedman *Jour Pharm & Exper Ther*, 45 (1932), 7
(7) L Davy *Endocrinology*, 18 (1934) 1
(8) O Swezy *J Lab Clin Med*, 19 (1934) 561

FROM THE RESEARCH LABORATORIES
PARKE DAVIS AND COMPANY
DETROIT, MICH

DRUG EXTRACTION I A STUDY OF VARIOUS MENSTRUA FROM THE STANDPOINT OF SWELLING EFFECTS, PENETRATION AND EXTRACTION [1] [2] [3]

BY WILLIAM J HUSA [4] AND LOUIS MAGID

INTRODUCTION

The extraction of drugs is a time-honored process However, there has been a feeling in recent years that the fundamental principles involved in this basic pharmaceutical procedure have received insufficient attention Such factors as the swellings of drugs in liquids and the penetration of menstrua have not been studied quantitatively and many official formulas are based to a considerable extent on empiricism and tradition

The purpose of the present investigation has been to make a critical study of the fundamental principles of drug extraction with special reference to permeation of cell walls by a selected series of pharmaceutical solvents, to swelling of cellular tissue during maceration with selected menstrua, and to the influence of menstrua upon the structure of vegetable drugs and extraction of the constituents

SWELLING EFFECT OF SOLVENTS

Chestnut wood, being a relatively simple vegetable structure, was chosen as the first material to be studied with the idea that the methods evolved and the data collected would be applied in the course of the investigation in the study of various types of drugs Chestnut wood consists largely of fibrous tissue and one of its constituents is tannin

Swelling of Strips of Chestnut Wood —A study of the swelling effect of solvents on thin sections was deemed advisable as the first point of attack The liquids

[1] Scientific Section A PH A, Washington meeting, 1934

[2] This investigation was aided by a grant from the AMERICAN PHARMACEUTICAL ASSOCIATION Research Fund

[3] This paper is based on a dissertation submitted by Louis Magid to the Graduate Council of the University of Florida in partial fulfilment of the requirements for the degree of Doctor of Philosophy

[4] Head Professor of Pharmacy University of Florida

customarily used to soften hard tissues for sectioning, such as solutions of hydrofluoric acid, potassium hydroxide, etc , obviously could not be used By the use of a "smoother" at a planing mill, thin cross-section shavings, suitable for microscopical study, were obtained A plan was devised of cutting a strip of a section of chestnut wood, 0 25 to 0 50 mm wide, so that the strip could be observed in the field of the microscope under low power and measurements made with a filar micrometer of the width of the strip before and after the addition of solvents The width of the strips ranged from 0 14 to 0 65 mm , and the length from 3 to 6 mm The thickness of the strips ranged from 0 045 to 0 070 mm The strips examined consisted largely of summer wood, inasmuch as strips of spring wood generally tore on the addition of water Measurements of swelling were made in units of the filar micrometer and for concise presentation in the tables which follow all results have been recalculated on a percentage basis with the width of the dry strip taken as 100 The results given are the average of 3 or more determinations in each case

Effect of Various Menstrua on Strips of Chestnut Wood —Scoville (1) has listed 20 different alcohol-water mixtures used as menstrua in official preparations and has suggested that some of these which differ slightly in percentage strength could well be eliminated From this list, 8 alcohol-water mixtures were selected and their effect on the width of strips of chestnut wood was determined Glycerin-water and glycerin-alcohol mixtures were studied similarly

The results in Table I indicate that mixtures of equal volumes of alcohol and water and mixtures containing less than this proportion of alcohol have practically the same swelling effect as water alone, causing an immediate swelling with very little further change during the two hours The weaker alcoholic menstrua apparently reach a swelling equilibrium within a few minutes With concentrations of alcohol exceeding 58 per cent by volume there is an increasing tendency toward a smaller immediate swelling and a more gradual approach to equilibrium (see Graph 1)

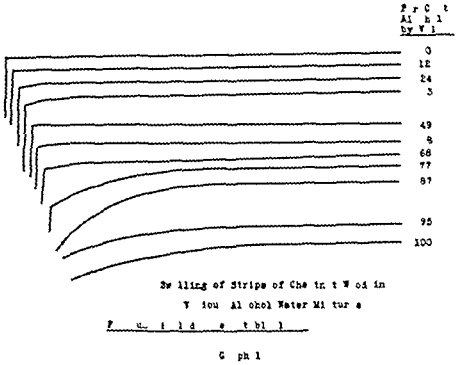
TABLE I —EFFECT OF VARIOUS ALCOHOL WATER MIXTURES

Per Cent Alcohol by Volume	Dry	After Time Intervals (Minutes)								
	0	1	5	10	20	40	60	80	100	120
0 (Water)	100	120	120	120	120	120	120	120	120	120
11 8	100	118	119	119	119	121	120	118	118	118
24 0	100	119	119	120	120	121	121	120	120	120
32 8	100	121	122	122	123	124	124	124	124	124
49 0	100	117	116	116	116	116	116	116	116	116
58 4	100	114	115	115	115	115	115	115	115	116
68 1	100	112	112	113	113	114	114	114	115	115
77 4	100	108	111	113	115	118	120	120	120	120
86 5	100	101	105	110	115	118	121	121	121	121
95 2	100	101	102	102	107	107	109	110	110	110
99 9	100	99	100	102	104	108	109	110	110	110

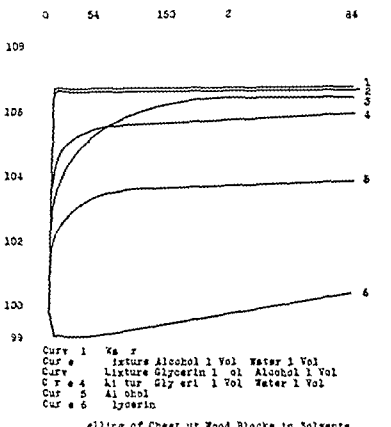
The results in Table II indicate that a mixture of 1 volume of glycerin and 7 volumes of water has practically the same effect as water alone With increasing concentrations of glycerin the primary rise decreases and a longer time is required for equilibrium to be reached Glycerin alone and a mixture of glycerin 9 volumes and water 1 volume both cause an immediate swelling of about 1 per cent with no further change during two hours (see Graph 2)

TABLE II —EFFECT OF VARIOUS GLYCERIN-WATER MIXTURES

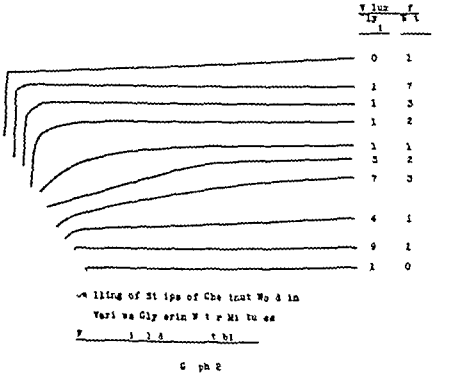
Volume of Glycerin	Volume of Water	Dry	After Time Intervals (Minutes)								
		0	1	5	10	20	40	60	80	100	120
0	1	100	120	120	120	120	120	120	120	120	120
1	7	100	122	124	124	124	124	124	124	124	124
1	3	100	116	119	121	121	121	121	121	121	121
1	2	100	113	119	120	121	122	122	122	122	122
1	1	100	103	106	108	112	114	116	116	116	116
3	2	100	101	102	103	106	111	115	116	117	117
7	3	100	103	103	105	108	111	114	116	117	118
4	1	100	103	103	103	104	105	106	107	108	109
9	1	100	101	101	101	101	101	101	101	101	101
1	0	100	101	101	101	101	101	101	101	101	101



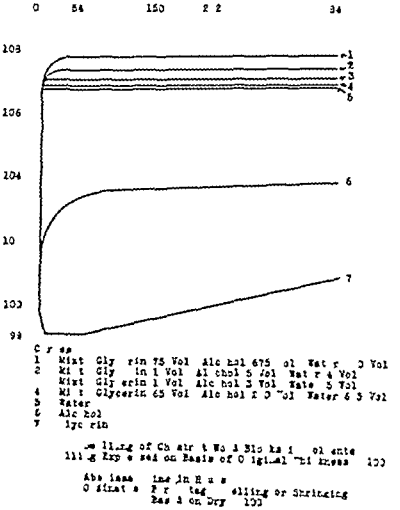
Graph 1



Graph 4



Graph 2



Graph 5

TABLE III —EFFECT OF VARIOUS GLYCERIN ALCOHOL MIXTURES

Volume of Glycerin	Volume of Alcohol	Dry	After Time Intervals (Minutes)								
		0	1	5	10	20	40	60	80	100	120
1	0	100	101	101	101	101	101	101	101	101	101
9	1	100	100	100	100	101	101	101	101	101	101
4	1	100	100	100	101	101	101	101	102	103	103
7	3	100	100	100	101	101	101	102	103	104	105
3	2	100	101	102	102	102	103	103	103	104	104
1	1	100	102	103	103	103	104	104	104	105	105
1	2	100	102	102	102	103	104	105	105	106	106
1	3	100	103	104	105	105	108	109	110	110	111
1	7	100	102	103	104	104	106	108	110	112	114
0	1	100	101	102	102	107	107	109	110	110	110

The results in Table III indicate that there is practically no swelling with glycerin and with a mixture of 9 volumes of glycerin and 1 volume of alcohol With increasing concentrations of alcohol there is an increase in the rate and amount of swelling (see Graph 3)

Effect of Acidity and Alkalinity on Swelling of Strips of Chestnut Wood —There is abundant evidence in the literature showing that acidity and alkalinity are important factors in the swelling of colloids and plant tissues In view of these facts and the established use of acids in menstrua of some official extractive preparations, it seemed desirable to know whether changes in acidity and alkalinity affect the swelling of drugs Using sodium hydroxide and hydrochloric acid, distilled water was adjusted to a series of p_H values by the colorimetric method with LaMotte indicators and standards The effect of these liquids on the swelling of strips of chestnut wood is shown in Table IV

TABLE IV —EFFECT OF WATER ADJUSTED TO VARIOUS p_H VALUES

p_H of Water	Dry	After Time Interval (Minutes)								
	0	1	5	10	20	40	60	80	100	120
0 9	100	121	121	121	121	121	121	121	121	121
1 9	100	120	120	120	120	120	120	120	120	120
3 1	100	121	121	122	122	122	122	122	122	122
4 7	100	120	120	120	120	120	120	120	120	120
5 7	100	120	120	120	120	120	120	120	120	120
6 9	100	120	120	120	120	120	120	120	120	120
7 5	100	120	121	121	121	121	121	121	121	121
8 9	100	122	122	123	123	123	123	123	123	123
10 5	100	120	121	121	121	121	121	122	122	122
12 0	100	119	121	122	122	123	123	123	123	123

From the above results it is seen that a variation in p_H of aqueous solutions from 0 9 to 12 0 has practically no effect on the swelling of simple woody tissue such as chestnut wood

TABLE V —EFFECT OF ACIDITY AND ALKALINITY OF ALCOHOL

Alcoholic Solution	Dry	After Time Intervals (Minutes)								
	0	1	5	10	20	40	60	80	100	120
Alcohol alone	100	101	102	102	107	107	109	110	110	110
0 01*N* NaOH	100	100	101	102	107	111	112	113	113	113
0 1*N* NaOH	100	102	103	105	108	113	115	117	117	117
0 01*N* HCl	100	100	101	102	105	107	108	108	108	108
0 1*N* HCl	100	101	102	102	102	102	103	104	104	105

The effect of varying the acidity and alkalinity of alcohol on the swelling of strips of chestnut wood is shown in Table V

The results indicate that in alcoholic solutions, an increase in alkalinity increases the swelling of strips of chestnut wood, while an increase in acidity decreases the swelling normally caused by alcohol

Effect of Successive Addition of Liquids on Strips of Chestnut Wood—The technique employed for determining the effect of successive addition of various liquids on the swelling of chestnut wood strips was that of adding the first liquid during a definite period of time to the strip removing as much as possible of the liquid by means of filter paper, and then adding the second liquid, etc The effect of successive additions of water, alcohol and absolute alcohol on strips of chestnut wood are shown in the following tables

TABLE VI —EFFECT OF SUCCESSIVE ADDITION OF WATER, ALCOHOL AND ABSOLUTE ALCOHOL

Time in Minutes	Dry	Water				Alcohol				Abs Alc	
	0	1	5	1	5	10	20	40	60	1	5
Average of 2 strips	100	114	115	112	112	112	112	113	114	110	111

It is seen that alcohol shrinks a strip swollen by water, and then causes a gradual swelling The addition of absolute alcohol at this point causes a shrinking

TABLE VII —EFFECT OF SUCCESSIVE ADDITION OF ALCOHOL AND WATER

Time in Minutes	Dry	Alcohol						Water	
	0	1	5	10	20	40	60	1	5
Average of 2 strips	100	101	102	103	105	109	114	124	127

The results show that alcohol causes the characteristic gradual swelling the addition of water after one hour causes an immediate marked increase in swelling

Experiments were also carried out on the successive addition of liquids as follows (*a*) absolute alcohol alcohol and water (*b*) alcohol and absolute alcohol, (*c*) water and absolute alcohol and (*d*) absolute alcohol and water Each liquid tended to exert its own effect regardless of whether this resulted in an increase or decrease of the swelling caused by the previously added liquid

Swelling Effect of Various Liquids on Extracted Strips of Chestnut Wood—To obtain materials for these tests, cross sections of chestnut wood were exhaustively extracted with water and with alcohol until the presence of tannin in the extraction liquids was no longer detected The sections were then air dried and used in the following experiments, using the technique of measuring the width of strips with a filar micrometer The following tables show the effect of various liquids and the successive addition of various liquids on strips of extracted chestnut wood The results in each case are the average of 3 or more determinations

TABLE VIII —EFFECT OF VARIOUS LIQUIDS ON EXTRACTED STRIPS OF CHESTNUT WOOD

Liquid	Dry	After Time Intervals (Minutes)								
	0	1	5	10	20	40	60	80	100	120
Water	100	118	119	119	119	119	119	119	119	119
5 per cent aqueous solution of tannin	100	119	120	120	120	120	120	120	120	120
Glycerin	100	100	100	100	100	100	100	101	101	101

TABLE IX —EFFECT OF SUCCESSIVE ADDITION OF VARIOUS LIQUIDS ON EXTRACTED STRIPS OF CHESTNUT WOOD

Abbreviations alc = alcoholic sol = solution, *N* = normal

Time in Minutes																				
0	1	5	10	20	40	60	120	1	5	10	20	40	1	5	10	20	40
Dry	Alcohol							0 1*N* alc HCl					Alcohol				
100	101	103	104	106	108	110	110	110	110	110	110	110	110	110	110	110	110
Dry	Alcohol							0 1 V alc NaOH					Alcohol				
100	101	102	103	104	107	109	109	109	109	110	110	111	111	111	110	110	110
Dry	0 1 V alc HCl							Alcohol									
100	101	102	103	105	107	107	107	108	108	108	108	108					
Dry	5 per cent alc sol tannin							Alcohol									
100	101	102	103	103	105	106	107	107	107	107	108	108					

Since the extracted strips of chestnut wood showed the same degree of swelling with various liquids as the unextracted strips, it is apparent that treatment with water and alcohol causes no permanent change in the structure of the tissues or at least no change capable of affecting the swelling properties, it is also apparent that the soluble constituents of this tissue are of no importance in swelling although a 5 per cent solution of tannin in alcohol decreased the swelling to a slight extent The results in Table IX show that on successive addition of liquids, usually each liquid tends to exert its own effect regardless of whether this results in an increase or decrease of the swelling caused by the previously added liquid

Swelling of Blocks of Chestnut Wood —The swelling of blocks of chestnut wood immersed in various solvents was studied The wood was cut into uniform 24 mm blocks, with the grain running the long way, and varying from 1 75 to 1 80 mm in thickness at the center (across the grain) Three blocks were placed in each solvent in stoppered flasks kept at a constant temperature of 30° C in a Freas large size water thermostat The blocks were weighted below the surface of the liquids by pieces of glass rod fastened by a thread The amount of swelling was based on the change in thickness (across grain), measurements being made with a micrometer caliper The results obtained from the effects of various liquids on the swelling of blocks of chestnut wood are given in Table X The results have been recalculated on a percentage basis, with the original thickness of the dry blocks taken as 100, and are based on the average of 3 blocks

TABLE X —EFFECT OF VARIOUS LIQUIDS ON BLOCKS OF CHESTNUT WOOD

Abbreviations alc = alcohol, abs = absolute, gly = glycerin, mixt = mixture, v = volume

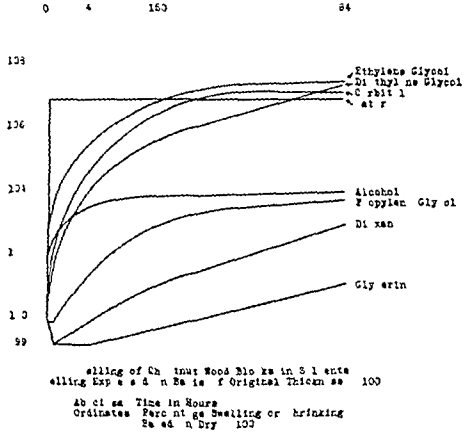
Liquid	Dry 0	After Time Intervals (Hours) 6	12	24	54	150	222	384
Water	100	106 9	106 9	106 9	106 9	106 9	106 9	106 9
Alcohol	100	102 6	102 8	102 9	103 6	103 7	103 9	104 0
Glycerin	100	99 3	99 3	99 3	99 3	100 0	100 3	101 1
Dioxan	100	99 3	99 4	99 5	99 8	101 3	101 8	103 0
Carbitol	100	101 3	102 7	103 5	104 4	106 5	107 1	107 1
Diethylene glycol	100	101 0	101 8	102 8	104 0	105 6	106 3	107 3
Propylene glycol	100	100 0	100 2	100 4	101 7	102 8	103 5	103 7
Ethylene glycol	100	103 7	104 0	104 5	105 3	107 0	107 3	107 4
0 01*N* aqueous HCl	100	107 5	107 6	107 6	107 5	107 7	107 7	107 8
0 01*N* aqueous NaOH	100	107 8	107 8	107 8	107 8	107 9	107 9	107 9
0 01*N* alcoholic HCl	100	102 2	102 5	103 0	103 5	103 9	103 9	103 9
0 01*N* alcoholic NaOH	100	102 2	102 7	102 9	103 2	103 3	103 3	103 3
Mixt alc 1 v —water 1 v	100	106 7	106 8	106 8	106 8	106 8	106 8	106 8
Mixt gly 1 v —water 1 v	100	104 6	105 2	105 6	105 7	105 8	106 1	106 1
Mixt gly 1 v —alc 1 v	100	103 4	104 1	105 3	105 4	106 0	106 6	106 6
Mixt gly 1 v —alc 5 v — water 4 v	100	107 2	107 4	107 4	107 5	107 5	107 5	107 5
Mixt gly 1 v —alc 3 v — water 5 v	100	107 1	107 2	107 2	107 2	107 2	107 2	107 2
Mixt gly 75 v —alc 675 v —water 250 v	100	107 3	107 4	107 9	107 9	107 9	107 9	107 9
Mixt gly 65 v —alc 250 v —water 685 v	100	107 0	107 0	107 0	107 0	107 0	107 0	107 0

The results of the above table show that water causes greater swelling than alcohol, and alcohol causes greater swelling than glycerin Considering the binary mixtures of water, alcohol and glycerin, we find that a mixture of alcohol 1 vol —

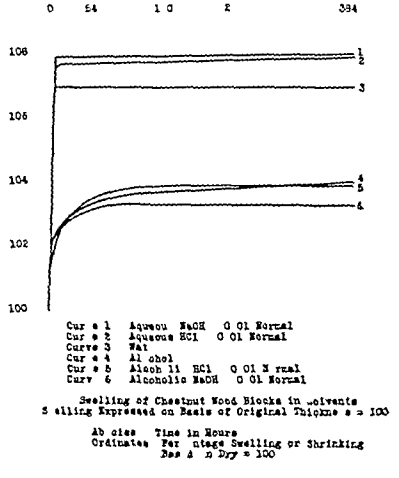
water 1 vol produces a swelling equal to that of water, but not reaching equilibrium quite as rapidly A mixture of equal parts of glycerin and alcohol produces greater swelling than a mixture of equal parts of glycerin and water, but the rate of swelling is slower (see Graph 4)

The ternary mixtures of water, alcohol and glycerin cause a slightly greater swelling than that brought about by water The ternary mixtures used are 4 of the glycerin-alcohol-water mixtures used in U S P and N F extractions The results indicate that the variations in the 4 official menstrua studied have practically no effect on swelling (see Graph 5)

Ethylene glycol, diethylene glycol and carbitol cause about the same percentage swelling as water, except that water comes to equilibrium more rapidly Dioxan and propylene glycol cause less swelling than alcohol but more than glycerin (see Graph 6)



Graph 6



Graph 7

The presence of 0 01*N* HCl and 0 01*N* NaOH in water slightly increases the swelling of blocks of chestnut wood, this slight difference was not observed in earlier experiments with strips, where individual differences are more pronounced In alcohol, 0 01*N* NaOH caused a slight decrease in swelling (see Graph 7)

Comparative Swelling with Grain and across Grain —It is a generally accepted fact that swelling is greater across grain than with the grain An experiment was carried out to secure quantitative data on this point Chestnut wood blocks of the same size used in the preceding experiment were placed in water and measurements of the length (with grain) and width (across grain) made at various time intervals Measurements were made both at the edge and at the center of the blocks The data, expressed on the basis dry = 100, were as follows, the results being based on the average of 3 blocks

TABLE XI

Swelling	Time in Hours 0 Dry	4	13	24	36 Water	72	124
Across grain (long way) edge	100	101 2	102 0	102 3	102 5	102 5	102 5
Across grain (long way) center	100	100 9	101 8	102 2	102 3	102 4	102 4
With grain (edge)	100	100 5	100 5	100 6	100 6	100 5	100 5
With grain (center)	100	100 6	100 6	100 5	100 6	100 6	100 6

The results show that swelling across grain is greater than with the grain Swelling at the center and edge of the blocks is practically the same

Photomicrographic Study of Swelling—The chief kinds of tissues in chestnut wood are fibres, vessels and medullary rays The structure is not uniform through out, on account of the variations in growth at different seasons Thus Plate 1 shows clearly the occurrence of spring wood, early summer wood and late summer wood

Photomicrographs were made of sections of spring wood and summer wood cut from blocks which had been immersed for 4 months in water, alcohol, glycerin and the respective mixtures of these liquids used in the swelling and penetration tests With water the cell walls appear filled out and under tension and the cavities appear fully opened From the difference in appearance of the tissues in alcohol and in glycerin it seems that alcohol may cause less swelling than glycerin With mixtures of equal volumes of glycerin and water and glycerin and alcohol, the cell walls appear to be completely swollen Ternary mixtures of glycerin-alcohol-water which were used, produced much the same effects as water alone Because of the variations in growth at different seasons there is a gradual change in the nature of the cells and it would not be safe to draw conclusions from fine measurements of cells from two different sections

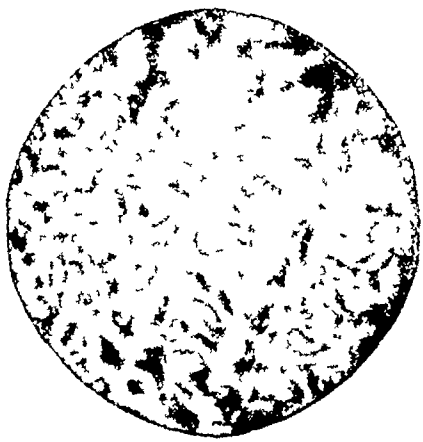


Plate 1—A section cut from a block immersed in alcohol for four months showing the different types of wood, namely spring wood (large cells), early summer wood and late summer wood (adjacent to spring wood)

Due to inherent difficulties standing in the way of direct comparisons between different sections, a study was made of the effects of consecutive addition of different solvents to the same section Since it was difficult to make thin sections of dry wood on the microtome, the procedure was adopted of obtaining sections from a block which had been immersed in alcohol for 4 months, the sections being air dried for several days before use, during which time they apparently reverted to approximately the original condition

Plate 2 shows the appearance of an air dried section of summer wood, and the appearance of the same section after successive treatment with alcohol (2 hours), water (1 hour) and glycerin (6 hours) By identifying certain cells and thus measuring the same cells after treatment with different liquids, the following measurements were obtained from the photomicrographs, using a reading glass and a metric scale, and expressing the results in mm Below are given the averages of the results

	Air Dried	Alcohol	Water	Glycerin
Across cavities	1 75	2 40	2 75	2 85
Between cavities (across double cell wall)	2 60	2 90	4 15	4 35
Between medullary rays	36	38	40	42

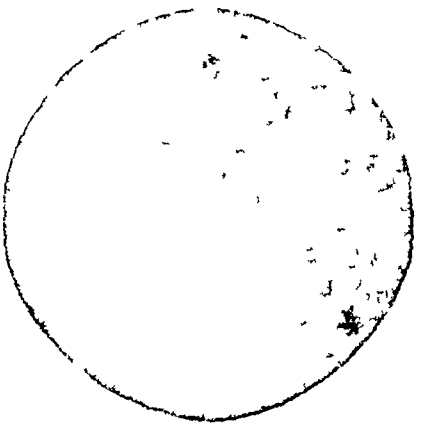


Fig 1

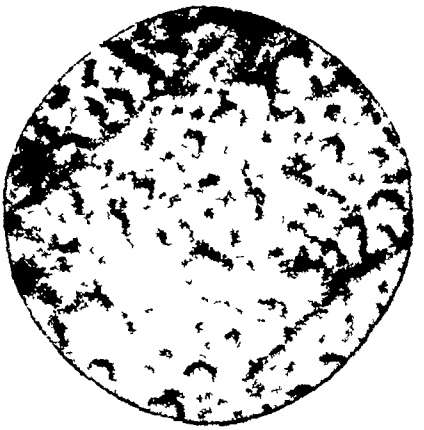


Fig 2

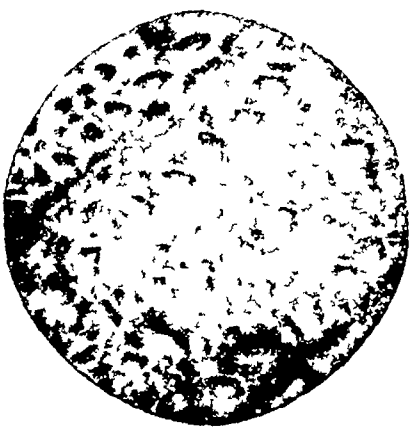


Fig 3

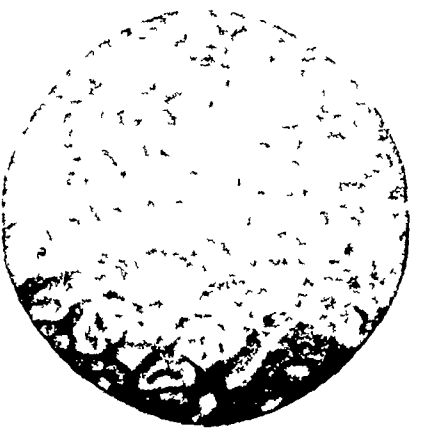


Fig 4

Photomicrographs of Chestnut Summer Wood

Plate 2 —A section cut from a block immersed in alcohol for four months was air dried (Fig 1), and treated consecutively with alcohol (Fig 2) water (Fig 3) and glycerin (Fig 4)

Thus it is seen that alcohol swells both the walls and cavities of the air-dried wood, both of which are enlarged by the successive addition of water and further slightly enlarged by glycerin

Photomicrographs were also prepared to show the successive treatment of an air dried section with (*a*) water, alcohol and glycerin, (*b*) glycerin and water, (*c*) glycerin and alcohol

Below are given the averages of measurements taken from photomicrographs of an air dried section of summer wood, treated consecutively with water (1 hour), alcohol (2 hours) and glycerin (6 hours)

	Air Dried	Water	Alcohol	Glycerin
Across cavities	1 65	2 00	2 00	2 25
Between cavities (across double cell wall)	3 85	5 30	4 75	5 15
Between medullary rays	34	38	36	37

It is seen that water causes a swelling of both walls and cavities, alcohol shrinks the walls but does not reverse the effect of water on the cavities, glycerin then increases the size of both the walls and cavities

Measurements were made between medullary rays in photomicrographs of an air-dried section treated with glycerin (6 hours) and then with water (12 hours), and are as follows air-dried 16 mm , glycerin 17 mm , water 18 mm Glycerin is thus shown to cause swelling There is a further swelling with water, which may be due to a more complete penetration by glycerin, since the addition of glycerin after water (Plate 2) caused an increase

An air-dried section was treated with glycerin (6 hours) and then with alcohol (12 hours) The distance between two medullary rays in photomicrographs of sections are as follows air-dried 29 mm , glycerin 33 mm , alcohol 31 mm It is thus seen that glycerin causes swelling and the subsequent treatment with alcohol caused some shrinking

Discussion of Results —In general, the results bear out the previous conclusions obtained on blocks and strips of chestnut wood, *i e* that alcohol causes some swelling, water causes a greater swelling than alcohol, while glycerin causes about the same swelling as water, although this effect is not shown when glycerin (undiluted) acts on dry wood, due to the very slow penetration by glycerin under these conditions

Swelling of Blocks of Other Woods —Tests were made on blocks of fresh oak sapwood of the water oak Quercus nigra, 1 (Fagaceæ), in three conditions namely, (*a*) fresh, (*b*) dried to constant weight at room temperature and (*c*) dried to constant weight at 90° C in an oven The blocks were about 25 mm square, about 5 mm thick (across grain) and averaged about 3 Gm in weight Using 3 blocks to each solvent, blocks were immersed in water alcohol and glycerin in bottles placed in a thermostat at 30° C After various intervals the blocks were removed and measured The results of the swelling tests are given in the following tables the figures in each case being based on the average of 3 blocks

TABLE XII —SWELLING OF FRESH OAK SAPWOOD BLOCKS IN LIQUIDS
(Dimensions of blocks stated on basis dry = 100)

Time in Hours	0	3	22	46	96	528	912	1536
				(Thickness—across grain)				
Water	100	100 0	100 0	100 0	100 0	100 1	100 1	100 1
Alcohol	100	100 0	100 0	99 9	99 8	99 9	99 9	99 9
Glycerin	100	100 0	100 0	100 0	100 0	100 0	100 0	100 0
				(Width—across grain)				
Water	100	100 0	100 0	100 0	100 0	100 1	100 1	100 1
Alcohol	100	100 0	100 0	100 0	100 1	100 2	100 3	100 3
Glycerin	100	100 0	100 0	100 0	100 0	100 2	100 2	100 2
				(Length—with grain)				
Water	100	100 0	100 0	100 0	100 0	100 0	100 0	100 0
Alcohol	100	100 0	100 0	100 0	100 0	100 0	100 0	100 0
Glycerin	100	100 0	100 0	100 0	100 0	100 1	100 1	100 1

The blocks of fresh sapwood of oak are apparently in a state of maximum size, inasmuch as there is practically no swelling in any of the three dimensions in water, alcohol or glycerin

TABLE XIII —LOSS IN SIZE OF BLOCKS OF FRESH OAK SAPWOOD ON DRYING

Time in Hours	0	3	22	46	96	528	912	1536
				(Thickness—across grain)				
Room temp	100	99 8	97 4	95 5	94 5	94 5	94 0	94 0
At 90° C	100	98 4	95 7	92 3	92 2	92 2	92 1	92 1
				(Width—across grain)				
Room temp	100	99 8	95 8	90 7	89 2	88 9	88 8	88 8
At 90° C	100	94 0	90 2	85 4	85 4	85 2	85 1	85 1
				(Length—with grain)				
Room temp	100	100 0	99 9	99 7	99 7	99 7	99 7	99 7
At 90° C	100	99 9	99 7	99 7	99 7	99 7	99 6	99 6

The loss in size of the blocks as shown in the table, occurs chiefly across the grain and is greater in the samples dried in the oven at 90° C than in the ones dried at room temperature It is strikingly shown that there is only a negligible shrinking with the grain on drying

TABLE XIV —SWELLING IN LIQUIDS OF OAK SAPWOOD BLOCKS DRIED AT ROOM TEMPERATURE

Time in Hours	0	3	10	24	72	240	720
(Dimensions of blocks stated on basis dimensions of fresh blocks *before drying* = 100)							
				(Thickness—across grain)			
Water	94 7	99 1	99 2	99 6	99 6	99 6	99 6
Alcohol	93 2	99 0	99 0	99 0	99 0	99 0	99 0
Glycerin	95 1	94 9	94 7	94 7	94 7	94 8	95 7
				(Width—across grain)			
Water	89 4	95 2	98 8	99 2	99 4	99 4	99 5
Alcohol	88 6	97 3	97 4	97 5	97 5	97 6	97 7
Glycerin	88 5	88 1	88 3	88 4	89 6	91 7	93 7
				(Length—with grain)			
Water	99 7	100 1	100 2	100 2	100 2	100 2	100 2
Alcohol	99 6	99 9	99 9	100 0	100 0	100 0	100 0
Glycerin	99 6	99 7	99 7	99 7	99 7	99 9	100 0

TABLE XV —SWELLING IN LIQUIDS OF OAK SAPWOOD BLOCKS DRIED IN OVEN AT 90° C

Time in Hours	0	3	10	24	72	240	720
(Dimensions of blocks stated on basis dimensions of fresh blocks *before drying* = 100)							
				(Thickness—across grain)			
Water	92 8	96 1	98 2	98 4	98 6	98 7	98 8
Alcohol	91 4	94 6	95 2	95 8	96 1	96 3	96 4
Glycerin	92 0	92 0	92 0	92 1	92 1	92 1	92 8
				(Width—across grain)			
Water	84 4	90 9	95 9	96 6	97 1	97 6	97 8
Alcohol	86 5	94 9	95 1	95 5	95 8	96 0	96 0
Glycerin	84 5	85 0	85 0	85 0	85 0	85 2	85 8
				(Length—with grain)			
Water	99 6	99 9	100 0	100 1	100 1	100 2	100 2
Alcohol	99 5	99 8	99 8	99 8	99 9	100 0	100 0
Glycerin	99 8	100 0	100 0	100 0	100 0	100 0	100 0

The dried blocks when immersed in liquids recover the slight decrease in length which occurred on drying, and the shrinkage across grain is reversed almost completely by water, less by alcohol and still less by glycerin

Results similar to those obtained on the effect of liquids on oak sapwood have been obtained on blocks of Elberta peach wood and on blocks of the sapwood of Sassafras varnifolium (Salisbury) O Kuntz (Lauraceæ) (*To be continued*)

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts Baltimore, Maryland

APPARATUS AND MANIPULATIONS

Anon
Ampul filler for pharmacy
Pharm Ztg 79 (1934) 830
Gutschmidt, J
Simple extraction apparatus
Pharm Ztg, 79 (1934), 819

PHARMACOPŒIAS AND FORMULARIES

Anon
The British Pharmaceutical Codex An historical survey
Pharm J, 133 (1934) 149
Casparis, P
Review of the Swiss Pharmacopœia V
Schweiz Apoth Ztg 72 (1934) 389

PHARMACEUTICAL PREPARATIONS

Anon
A suspension of phenolphthalein
Chem & Drug, 121 (1934) 210
Husa, William J, and Klotz, Lyell J
The stabilization of Syrup of Ferrous Iodide
JOUR A PH A, 23 (1934) 774
Rothenkirchen Koln O
Technic for emulsification of cod liver oil
Pharm Ztg 79 (1934), 804

PHARMACOLOGY TOXICOLOGY AND THERAPEUTICS

Cooper, Nathaniel and Hatcher Robert A
A contribution to the pharmacology of narcotine
J Pharmacol & Exper Therap, 51 (1934), 411
Ford William K
Drug eruption due to quinine Recurrence following use of contraceptive
J A M A 103 (1934), 483
Freeman, H
The effect of dinitrophenol upon the circulation time
J Pharmacol & Exper Therap, 51 (1934), 477
Kopaczewski W
Effect of anions on activity of ferments
Bull sci pharmacol, 41 (1934), 391
Lott, W A, and Christiansen, W G
A study of the acrylic amides and ureides as hypnotics
JOUR A PH A 23 (1934) 788
Melville, K I and Holman D V
The diuretic action of pituitary extracts and the responsible principle or constituent
J Pharmacol & Exper Therap, 51 (1934) 459
Munch, James C
Saliva tests I Morphine
JOUR A PH A 23 (1934), 766
Sage C E
The use of alkaloids in medicine
Pharm J, 133 (1934) 177
Schulze K
Action and chemical constitution of the soporifics of the urea series
Beilage Pharm Presse 5 (1934), 79
Wolffe, Joseph B, and Munch James C
Aconite IV Electrocardiographic and pharmacological studies of aconite and its alkaloids
J Pharmacol & Exper Therap 51 (1934) 471

BOTANY AND PHARMACOGNOSY

Harris, Loyd E and Conner Ruth Ann
The leaves of Pentstemon Cobæa, Nutt.
JOUR A PH A, 23 (1934), 796
Karsmark, K A
Chromosome suppression in *Linum usitatissimum*
Farm Revy, 33 (1934), 429
Offerhaus C, and Baert C G
Anesthetics, particularly cocaine and novocaine
Pharm Weekbl, 71 (1934), 817
Peyer W
Pharmacognostic and chemical studies of the drugs of the 'Erganzungsbuch V" in powdered form
Apoth-Ztg, 49 (1934), 938 971, 991 1022 1040, 1055

ALKALOIDS AND GLUCOSIDES

Dafert O *et al*
Saponin and sapogenin from *Chenopodium ambrosioides L*
Beilage Pharm Presse, 5 (1934) 84

Dietzel, R
Decomposition of alkaloidal solutions during storage and on heating
Pharm Zentralh, 75 (1934), 469
Hatcher, Robert A
Cinchonine solubility
Am J Pharm, 106 (1934), 244
Leger, E
Determination of alkaloids in cinchona preparations
J pharm chim, 20 (1934) 103
Leger, E
Determination of morphine in opium by the lime method
Bull sci pharmacol, 41 (1934), 385
Lutz, Robert E, and Small Lyndon
Reduction studies in the morphine series II The isomeric phenolic dihydropseudocodeines
J Am Chem Soc, 56 (1934), 1741
Mateles, M, and Lagrange, G
Examination of the international determination of morphine in powdered opium
J pharm Belg, 16 (1934), 591, 611
Picon, M
Utilization of solubilities of quinine iodobismuthate in therapeutics and for the assay of the metal
J pharm chim, 19 (1934) 49
Wagenaar, M
Detection of alkaloids in cross sections of plant tissues
Pharm Weekbl 71 (1934), 834
Suzuki K
Investigation of alkaloids of stemona species IV, V, VI
J Pharm Soc Japan, 628 (1934), 96, 100, 101
Wales H
The water of crystallization of quinine sulphate
Jour A Ph A, 23 (1934) 793
Welch, Arnold D and Henderson V E
A comparative study of hydrastine, bicuculline and adlumine
J Pharmacol & Exper Therap 51 (1934) 482
Welch, Arnold D, and Henderson V E
Note on bicucine
J Pharmacol & Exper Therap, 51 (1934) 492

ESSENTIAL OILS

Anon
Isolation of piperitone
Perf & Ess Oil Rec, 25 (1934) 209
Freise Fred W
Brazilian Copaiba Balsam
Perf & Ess Oil Rec, 25 (1934) 218
Hanford, W E, and Perkins, G W
Studies on oil of turpentine Camphor from pinene-hydrochloride
Am J Pharm, 106 (1934), 287
Lagneau, C
Principal constituents of rose and geranium oils
J Soc Chem Ind 53 (1934), 651B
Nelson E K, and Mottern, H H
Florida grapefruit oil—composition and preparation of terpeneless oil
Perf & Ess Oil Rec, 25 (1934), 205

OILS FATS AND WAXES

Riebsomer, J L and Nesty, G A
An examination of the fatty oil from pumpkin seed The constitution of linoleic acid
J Am Chem Soc 56 (1934) 1784
Sant G
Surinam chaulmoogra oil
Pharm Weekbl 71 (1934) 900

ANALYTICAL METHODS AND RESULTS

Baggesgaard-Rasmussen, H, Jackerott, K A, and Jespersen I C
Quantitative determination of morphine IV Determination of morphine in opium by the lime method
Dansk Tids Farm 8 (1934) 185
Deniges, G
New color reaction and colorimetric determination of cantharidin
Bull soc pharm Bordeaux 72 (1934), 85
Desbordes, Jean
Tests for indoxylemia and indoxyluria
Bull sci pharmacol, 41 (1934) 402
Eschenbreenner, H
Some new investigations of medicinal preparations
Pharm Ztg, 79 (1934) 828
Foucry M
Use of quinone as a reagent for amines
J pharm chim, 20 (1934) 116
Freise F W
Fluorescence analysis as a means of preliminary investigation of drug adulteration
Pharm Ztg, 79 (1934), 854
Jespersen, I C, and Larsen, K T
Identification of important barbiturates
Dansk Tids Farm, 8 (1934), 212
Junghans G
Determination of water content of drugs
Apoth-Ztg 49 (1934), 1084
Koszegi D, and Tomori, N
New volumetric evaluation of mercury iodides
Pharm Zentralh 75 (1934) 532

Monforte, F
Determination of arsenic in certain organic arsenical products
J Soc Chem Ind, 53 (1934), 650B
Ogata A, and Konishi M
Diethylbenzhydrylamine hydrochloride as reagent for nitric acid
J Pharm Soc Japan, No 628 (1934) 93
Oldham, John Walter Hyde
Determination of aliphatic nitrates by titration
J Soc Chem Ind, 53 (1934), 236T
Schulze, K
Evaluation of pepsin by the coagulation method
Apoth-Ztg, 49 (1934), 1039
Simon, E
Detection of triethanolamine by means of cobaltous compounds
Pharm Ztg, 79 (1934) 842
Snethlage, H C S
Evaluation of solution of sodium thiosulphate by use of potassium dichromate
Rec trav chim Pays-Bas (1934), 567 through *Pharm Zentralh* 75 (1934), 536
Termansen, J B
Starch solution as indicator
Arch Pharm Chem 41 (1934) 533
Tschirch E
Volumetric determination of titanium
Pharm Zentralh 75 (1934) 513
Van Zijp C
Micro-reaction of saccharin with copper-pyridine
Pharm Weekbl 71 (1934), 858
Wiggins W R, and Wood, C E
Note on the determination of zinc in the presence of uranium
J Soc Chem Ind, 53 (1934), 254T

INORGANIC CHEMICALS

Owen Benton Brooks
The dissociation constant of boric acid from 10 to 50°
J Am Chem Soc, 56 (1934), 1695
Stern A
The new element Bohemium The origin of Proto-Actinium
J Soc Chem Ind 53 (1934) 678

ORGANIC CHEMICALS

Ekkert, L
Contribution to the reactions of adalin and bromural
Pharm Zentralh 75 (1934), 535
Ekkert, L
Contribution to the reactions of carbohydrates. II
Pharm Zentralh 75 (1934), 515
Graham J Howard
Surface tension determinations of some barbiturates
Am J Pharm 106 (1934), 295
Kleiderer E C, and Shonle, H A
Studies on some optically active barbituric acids
J Am Chem Soc, 56 (1934), 1772
Lott W A and Christiansen, W G
The preparation and bacteriological study of certain thiazole azo dyes
Jour A Ph A 23 (1934) 785
Pollard C B, *et al*
Derivatives of Piperazine II Utilization in identification of fatty acids
J Am Chem Soc 56 (1934), 1759
Strain, Harold H
***d*-Sorbitol A new source, method of isolation, properties and derivatives**
J Am Chem Soc 56 (1934), 1756

DIAGNOSTIC TESTS AND REAGENTS

Stieglitz, Edward J and Palmer, Alice E
A colorimetric method for the determination of nitrite in blood
J Pharmacol & Exper Therap 51 (1934) 398

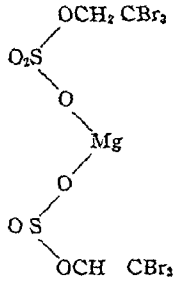
MAGNESIUM SALT OF TRIBROMETHYL SULPHURIC ACID *

BY E MONESS AND W G CHRISTIANSEN

As part of a research on rectal anesthetics we became interested in determining whether or not the anesthetic properties of magnesium sulphate and polyhalogen aliphatic compounds could be combined in a single, water-soluble compound Polyhalogen compounds such as ethyl chloride, methylene chloride and chloroform are inhalation anesthetics and tribrom ethanol is a rectal anesthetic It seemed

* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933

possible that the magnesium salt of tribromethyl sulphuric acid (I) might be a useful, water-soluble, rectal anesthetic



The acid ester was prepared by reacting tribromethanol with fuming sulphuric acid in the cold It was then converted into the magnesium salt This salt was water-soluble but its activity as a rectal anesthetic was about one-eighth of that of tribromomethanol, *i e*, approximately eight times the quantity of this salt, as compared with tribromoethanol, were required to produce rectal analgesia

The tests were made using 5%, 10%, 15% and 20% aqueous solutions of the salts and injecting a constant volume (25 cc /Kg) into rats Results were entirely negative with the 5% and 10% solutions The 15% solution (dose 3 75 Gm /Kg) produced a weakened ataxic condition which persisted up to the time the animal was sacrificed four hours later The rat to which the 20% solution was administered failed to respond to tail pinching 55 minutes after dosage This analgesic condition, with marked and continually increasing weakness, persisted from then until the animal died 35 minutes later This behavior indicates that the compound cannot be advantageously used as a rectal anesthetic

EXPERIMENTAL

Preparation of the Magnesium Salt of the Acid Sulphate of Tribromethanol ($CBr_3\ CH_2\ OSO_4)_2$-*Mg*—The method is an adaptation of the one disclosed in German Patent 7278, December 31, 1893, for the preparation of sodium amyl sulphate

4 2 Gm of tribromethanol was placed in a small test tube and to it was added 1 5 Gm of concentrated sulphuric acid The viscous solution was cooled in an ice salt bath and 2 Gm of 60% fuming sulphuric acid was added from a small burette—one drop at a time, stirring with a thermometer, and not permitting the temperature to rise above 0° C—about 25 minutes were required After about half of the fuming sulphuric acid had been added, the reaction mixture became semi solid It was allowed to come to room temperature and poured into crushed ice and water The excess sulphuric acid was precipitated with a solution of a slight excess of $Ba(OH)_2$ and the barium sulphate was filtered off The excess barium hydroxide in the filtrate was then precipitated with a solution of magnesium sulphate the precipitate filtered off and the filtrate evaporated to dryness *in vacuo* at a temperature of 50° C The residue was now extracted twice with absolute alcohol, and the extract evaporated to a small volume by the addition of a large volume of ether The compound was precipitated from this solution as a white crystalline salt, which was washed with ether by decantation and dried *in vacuo* Yield—2 2 Gm of a water-soluble and alcohol soluble salt

Analysis	Found	Calculated for $(C_3H_2Br_3SO_4)_2Mg$
Br	58 4%	64 2%
Mg	4 72%	3 25%
S	9 06%	8 55%

The analysis shows that our compound was contaminated with a small amount of $MgSO_4$, but this was held not to interfere with the tests for rectal anesthesia

The compound, when heated for a long time at 100° C decomposes with the liberation of HBr, and the formation of water and alcohol-insoluble substance

The biological tests on compounds reported herein were made in the biological Research Laboratories of E R Squibb and Sons and we gratefully acknowledge their assistance

RESEARCH DEPARTMENT OF THE CHEMICAL
AND PHARMACEUTICAL LABORATORIES,
E R SQUIBB AND SONS, BROOKLYN, N Y

A METHOD FOR THE PREPARATION OF PARENTERAL DEXTROSE SOLUTIONS

BY HARVEY A K WHITNEY *

As a first premise it may be stated that a solution of dextrose suitable for parenteral administration may be made from a simple solution of chemically pure dextrose in chemically pure water This statement is made with due consideration for the arguments for and against such factors as distilling apparatus, water, dextrose, hydrogen-ion concentration, buffers, preservatives and glass ware These modifying factors must be given consideration and together with the following elements, introduced at the time of administration, such as infusion apparatus, temperature of solution, velocity of injection and individual idiosyncrasy serve to complicate the apparently simple procedure issued as the original premise

Distilling apparatus should be of a design that incorporates the following desirable and necessary features Preferably the entrance of the raw water to the boiling chamber should be through condensers, permitting a preheating of the raw water, and venting the consequent discharge of many volatile substances The insertion of a spray-trap or baffle-plates is also requisite to prevent the mechanical carry-over of boiling water or wet steam into the distillate And lastly, the final delivery of the pure dry steam into vented condensers that will permit, if necessary, the delivery of the distillate into a closed system It is pertinent to add that the whole interior of the distilling system should be lined with block tin

Water obtained from the apparatus described, and under the circumstances necessary for the proper operation of the still, will provide a suitable solvent that may be used for the preparation of Aqua Destillata Sterilisata, U S P Water distilled within the working hours of the morning or afternoon should be collected and disposed in a sterilized container of insoluble glass The containers should be stoppered and sterilized under steam pressure giving a temperature of 115° C for thirty minutes If an autoclave is not available, close the mouth of flask containing freshly distilled water with a plug of purified absorbent cotton wrapped in gauze, and boil contents actively for one hour Until ready for use, protect the mouth of flask, and plug from infection through dust, by wrapping top of flask tightly with paper Sterilized distilled water so prepared should be used within

* Section on Practical Pharmacy and Dispensing, A PH A , Washington meeting, 1934

twenty-four hours after its distillation That such water must be protected against microorganic contamination was definitely shown by Seibert (*Am J Physiol*, 67 (1923), 90) The product described by her as "pyrogen" is held to be greatly responsible for post-infusion "bad" reactions The observations of precautions enumerated by the United States Pharmacopœia are quite sufficient to prevent bacterial infection of water properly distilled

Dextrose of no less a quality than that defined by the Pharmacopœia should be used This provides definite limits for water content, ash, dextrin, lactose, soluble starch, sulphites, sulphates, chlorides, heavy metals and optical rotation Under no circumstances should impure glucose (corn syrup) be employed in this work

Hydrogen-ion concentration measurement of the simple dextrose solution reveals a figure that is probably never more acidic than p_H 5 0, after sterilization, unless excessive decomposition (caramelization) obtains In general this measure of hydrogen-ion concentration is indicative of the degree of decomposition after sterilization It should be further appreciated that this figure also discloses another significant fact in that *practically all available acidity is measured* Such knowledge should tend to minimize the anticipated physiologic effect of using such dextrose solutions that are more acid than the blood It may still be admitted, however, that in some extraordinary instances of excessive depletion of the alkali reserve, the extemporaneous addition of an alkali (buffer salts) at the time of administration may be discreet For the reasons just mentioned it may be concluded that the routine use of buffer salts is to be depreciated

Preservatives, generally, are not in use at the present time The use of such materials was quite generally discussed and disposed of by the Council on Pharmacy and Chemistry of the A M A Certainly the introduction of a preservative in this solution is to be regarded as an admission of lack of professional skill

Glassware, unquestionably, should be uninfluential to the hydrogen-ion concentration and chemical balance of the solution it contains To provide for this unchanging condition, the use of insoluble or alkali-free glass is advised Our own experience with "hard" and "soft" glass has developed some interesting observations It can well be imagined there are intermediate qualities of glass that make available qualities "harder" than "soft" At present we are using, with considerable satisfaction, such an electric-tempered "harder-than-soft" quality in the shape of a wide-mouth french-square bottle of forty-ounce capacity finished with a shallow continuous screw thread (G C A 400) that permits the use of a special 48-mm molded screw cap fitted with a packet liner These bottles will contain one liter of solution with sufficient residual void In use such bottles routinely receive a preliminary cleansing and subsequent processing generally in accord with the following routine They are filled with a solution of boric acid, autoclaved, and the solution dispensed for surgical purposes Upon return of the empty bottles to the pharmacy they are thoroughly washed, rinsed well with freshly distilled water, capped and dried and sterilized in a Lautenschlager-type sterilizer They are then regarded as conditioned for use with dextrose solutions Glassware in which the silicates (free-alkali) have been so fixed has proven itself suited for this particular use

Rubber tubing, unless carefully selected introduces a factor active in the pro-

duction of untoward reactions Only specially selected pure gum rubber tubing should be used for setting up the infusion apparatus This tubing should be prepared for use, when new, by thoroughly washing in running tap water Then soak, or better autoclave, in a 5% solution of sodium carbonate Finally a rinse in running distilled water for another thirty minutes will provide a suitable tubing After this preparation it may be wrapped in a towel and sterilized by autoclaving in the approved manner It is further suggested that after the apparatus has been set up for an infusion it is always best to discard the first fraction of solution being administered that will completely fill the length of tubing used

Solutions of dextrose in the distilled water should be brought about with all the pharmaceutical skill at one's command We prefer to pass this solution through a Berkefeld filter, under pressure, more with the thought of clarifying the solution than of obtaining a sterile product This solution is transferred into the containers described, capped and hooded with a parchment paper cap that protects the lip and neck of the bottle This hermetically sealed package is placed in the autoclave and processed as described for Aqua Destillata Sterilisata, that is, sterilization is to be preferably accomplished under steam pressure giving a temperature of 115° C and maintained for thirty minutes It should be reiterated that a common fault of "soft" glassware, if not properly prepared, is that at this temperature discoloration as by caramelization may develop Sample bottles are selected from each lot and tested chemically and bacteriologically The finished solution for parenteral use is a clear, colorless, sterile, physiologically compatible solution A printed label describing the solution as to composition and character, together with a control number identifying the batch, is then attached Such solutions remain stable for a considerable time

---

THE EXTEMPORANEOUS PREPARATION OF SALINE AND GLUCOSE SOLUTIONS FOR INTRAVENOUS USE *

BY ROBERT S FUQUA [1]

The use of intravenous therapy by physicians and surgeons has been constantly increasing in late years, especially in hospital practice While manufacturing pharmacists have done much to make intravenous medication safer and more convenient for the physician, it appears that most pharmacists outside the manufacturing field have been slow to accept responsibility for the extemporaneous preparation of suitable solutions for this form of medication Since the need for much of the intravenous medication is largely of an emergency nature, the writer can think of no valid reason why the trained pharmacist, in either the hospital or retail field, should consider this work to be the sole responsibility of the large manufacturing laboratories

As indicated in the title, this paper will discuss the preparation of only the two most frequently used solutions of this type—that of Physiological Saline Solution, or "Normal Salt," and the intravenous solutions of Dextrose Such information regarding these as the writer has been able to obtain, has been gained

* Section on Practical Pharmacy and Dispensing, A PH A , Washington meeting, 1934

[1] Chief Pharmacist Johns Hopkins Hospital, Baltimore, Md

over a period of years in the pharmacy department of one of the larger eastern hospitals, where large volumes of such solutions are prepared This experience has shown that with proper care, close attention to details and a supply of pure materials, the well-trained pharmacist can, with a little practice, soon become proficient in the preparation of satisfactory intravenous solutions

Regarding the materials required, it should be remembered that the standards of purity set up in our Pharmacopœia for some of these items are not established on the theory that all U S P chemicals, and the distilled water used for pharmaceutical compounding, must be of sufficient purity for intravenous therapy No super-judgment is required to determine those instances in which materials of a higher standard of purity than is necessary for oral medication should be used for this purpose In the case of dextrose, it is perhaps unfortunate that we must have in the Pharmacopœia the impure mixture of dextrins, dextrose and levulose recognized under the title "Glucosum," when physicans assume that medicinally the name Glucose applies only to the U S P Dextrose, or D—Glucose At this time however, it seems rather unlikely that any pharmacist would dispense the impure syrupy product when glucose is ordered by a physician for medicinal uses For making intravenous solutions, the U S P Dextrose, which usually contains traces of dextrin, and possibly sulphur dioxide, should not be used Only the variety of glucose marketed by standard chemical manufacturers as "C P Anhydrous Dextrose" should be used The processes employed in the dehydration and recrystallization of the latter product remove practically all traces of the above-named impurities, which may be present in the hydrated material

In making Normal Salt Solution, I would not hesitate to use sodium chloride of U S P purity specifications when a purer salt was not immediately available However, we may, and do, use a C P or Reagent grade of sodium chloride to insure maximum purity in saline solution for intravenous administration A point which I would like to stress here is that no chemical which has been freely exposed to contamination by dust and other atmospheric impurities should be used in solutions which are to be injected into the blood stream, regardless of indicated purity on label of container This applies with even more force to the distilled water which is to be used as a solvent The Pharmacopœia lists certain tests to which distilled water must conform to be satisfactory for ordinary pharmaceutical purposes Here again, water which conforms to these mandatory requirements as to purity may fall short of that degree of purity needed to produce satisfactory intravenous solutions Distilled water may pass all standard tests for chemical purity, and be more nearly neutral in reaction to hydrogen-ion indicators than is necessary to come within the p_H range of those specified in the U S P , and still be totally unfit for intravenous injection, because of bacterial contamination The specifications set up for the "Sterilized Distilled Water" of the U S P are in line with those generally held necessary for a suitable diluent for the sterile concentrated solutions supplied in ampuls by manufacturing laboratories, and for general hypodermic use For the extemporaneous preparation of these solutions, which must be filtered and sterilized as final steps, we need freshly distilled water, which has been exposed to bacterial or other contamination as little as possible, but not necessarily sterilized before use All distilled water contains traces of carbon dioxide and oxygen, which are absorbed when steam is condensed, and usually will

absorb more on standing in contact with air We have found however, that the usual slight acidity in distilled water, when due entirely to small quantities of CO_2 in solution, is of small consequence as compared to the dangers incident to undue exposure of the fresh distillate to contaminated atmosphere

Sterilization of solutions will kill all living bacteria which they contain, but will not remove the bacterial proteins and other related impurities which remain in the finished product This fact is well known to all interested persons, but seems to be frequently overlooked Perhaps we sometimes forget that the atmosphere in most places is loaded with bacteria and organisms of various sorts and that these furnish the proteins and other substances which produce most of the toxic symptoms observed when carelessly prepared intravenous solutions are used Under no circumstances should distilled water which has been purchased in bulk containers, commercially, be used in preparing intravenous solutions, unless same has been redistilled immediately before use, and according to the Pharmacopœial process Normal Salt Solution which has not been freshly prepared should likewise not be used as a solvent

I would like to depart from subject in hand momentarily, to say that Normal Salt solution should never be kept on hand in pharmacies for use when same is ordered as a solvent in any preparation We have had bacteriological tests made on such solutions which were made under aseptic conditions and stored in partly filled, cork-stoppered bottles, on prescription-counter shelves After two weeks many colonies of bacteria appear in cultures, and after one month such solutions are dangerous to use in preparations for local use on membranous surfaces, or in the eye if same has been injured

Regarding the process of making Normal Salt Solution for intravenous use, little need be said here Our procedure calls for the use of water which has been distilled the same day as used, and protected as far as possible from atmospheric or other contamination before use Solutions are now being filtered through a hard smooth-surfaced filter paper, in covered glass funnels, into a well covered, glass-lined receptacle When filtration is completed the finished solution is placed in flasks of suitable size, stoppered with a plug of non-absorbent cotton wrapped in close-meshed gauze, which has been previously flamed to remove adhering lint, capped with a strong paper cap which extends well down the neck of the flasks, and then sterilized Our sterilizing technique calls for autoclaving this solution at 125° C for a period of thirty minutes In the retail establishment not having facilities for autoclaving, sterilization may be accomplished for immediate use by boiling the solution for an equal length of time, providing an excess of water sufficient to take care of evaporation is added when solution is made Proper filtration of this solution appears to be the greatest problem encountered A complete absence of filter shred in filtrate is impossible to obtain with the standard grades of pharmaceutical filter paper, especially those with creped surfaces After a number of experiments we selected an extra-hard grade of smooth surfaced paper as offering the most practical solution Suction filtration through candle filters will give better results for a time, but on extended use these are not wholly satisfactory For large-scale production we keep a battery of these on hand for use in case a faulty lot of filter paper is encountered

In making intravenous glucose solutions we use freshly distilled water, col

lected directly from the still in large glass flasks The glucose is dissolved in this immediately, without heat, and solutions are filtered at once through chemically hardened filter paper, in Buchner type porcelain funnels, by means of vacuum suction, into flasks which have been thoroughly cleaned and rinsed Solutions are refiltered if necessary to secure a properly cleaned filtrate Filtered solutions which show only occasional isolated paper shreds are strained through sterile fine-meshed silk cloth to remove same, rather than risk further contamination in repeated filtrations Small squares of silk cloth are kept on hand for this purpose, immersed in 70% alcohol Filtration of solutions of dextrose is not difficult and vacuum-suction is not necessary when the softer grades of filter paper are used It should be noted, however, that only those grades of filter paper which are free from starch and chlorine should be employed in the filtration of solutions for either hypodermic or intravenous use More shreds will usually be found in filtrates when non-parchmentized papers are used, but these shreds can be removed if a silk cloth of very fine mesh is available for straining Silk bolting cloth (200 mesh per inch) is very satisfactory for this purpose, but is rather expensive These solutions are placed in flasks of proper size, stoppered and capped in the same manner as described for saline solution, and sterilized the same day as made After cooling, the flasks of sterile glucose solution are placed in low-temperature refrigerators to prevent possible fermentation before use Our routine age limit for the use of these sterile solutions, prepared and stored as indicated, is five days Bacteriological tests have shown them to remain sterile in the flasks for a much longer period, but the shorter time limit is placed as a safety precaution Sterilization of glucose solutions is accomplished by autoclaving at 120° C for fifteen minutes, with volume per flask being limited to not more than 600 cc Flasks are placed on hardwood boards in sterilizers to protect bottoms of flasks from overheating on metal shelves Solutions of 5 and 10 per cent strengths are turned out sterile and crystal clear under this treatment If an autoclave is not available, glucose solutions may be rendered sterile for immediate use by heating on a water-bath, partially immersed in boiling water, for one hour Depending on filtration through the usual type of candle filter to render glucose solutions sterile is not a safe procedure to follow

Questions regarding the advisability of buffering solutions of dextrose which are to be administered intravenously are frequently brought up, and considerable disagreement exists among physicians on this point At present the apparent consensus of opinion appears to regard the addition of buffer salts necessary in only a small percentage of cases Under other methods of preparing and preserving solutions, or for prolonged continuous administration, buffering might render these solutions safer to use In our institution several thousand gallons of intravenous glucose solutions are being used each year, and we seldom find it necessary to use buffer salts in same in order to secure satisfactory clinical results

A second question, on which there appears to be no consensus of medical opinion, pertains to the necessity of using double or triple distilled water in intravenous solutions in order to obtain satisfactory results No answer to this question which did not take into consideration the quality of raw water supply, type of distilling apparatus and other factors involved in individual cases, would be proper With a raw water supply of good quality, and with efficient automatic distilling

apparatus, to the operation of which we devote some care, we have found multiple distillations unnecessary

To sum up, I would say that if reactions are to be avoided in the use of these intravenous solutions, cleanliness and care in the preparation are necessary from start to finish The chemicals used must be of a proper degree of purity, and must be kept free from contamination by dust and moisture All utensils and apparatus used must be thoroughly cleaned, and then rinsed with freshly distilled water before being used The distilled water and finished solutions must not be contaminated by undue exposure to dust and bacteria in the air Sterilization will kill bacteria but does not remove them from solutions The presence of excessive numbers of killed bacteria in solutions may cause reactions Filtration and sterilization methods employed must be adapted to the particular product being handled, and suitable methods of preservation must be employed to protect unstable solutions packaged in containers which are not sealed The use of chemical preservatives, in sufficient quantities to keep solutions sterile, is not permissible where large volumes of dilute solutions are to be administered intravenously

---

STUDIES ON BISMUTH SUBSALICYLATE PREPARATIONS *

BY WILLAIM F REINDOLLAR

One of the important recent developments in syphilotherapy is the treatment of that disease by intramuscular injections of suspensions of insoluble bismuth compounds in oil This drug is alternated with the arsenicals in a course of treatment, thereby reducing the toxic effects, caused by prolonged administration of the latter, and at the same time preventing the spirochete from adjusting itself to the environment produced by either drug The serious consequences that may follow injections beneath the skin of any product of inferior quality, together with the toxic effects that follow an overdose, make the control both of the qualitative and quantitative aspects of the product a matter of paramount importance

Bismuth as a spirillicide has been said to be second to arsphenamine and superior to mercury It is less toxic than either arsenic or mercury, dose for dose, and apparently exhibits no predilection for any particular organ It is slowly absorbed and probably cumulative Although numerous forms of this drug are employed we are concerned only with the official product, bismuth subsalicylate This is described in the U S P X as "a basic salt of varying chemical composition, which, when dried to constant weight at 100° C yields upon ignition not less than 62% and not more than 66% of bismuth oxide "

In the venereal clinics of the Maryland State Health Department bismuth is administered as the subsalicylate in suspension in olive oil, the concentration being so adjusted that 0 1 Gm metallic bismuth is received in 1 cc of oil The injection is made deep into the gluteal muscles of the upper outer quadrant of the buttock, alternating the right and left sides For administrations of this type it is evident that a drug must not only contain the correct amount of active ingredient, but must exhibit certain physical and chemical properties, if it is to produce an opti-

* Section on Practical Pharmacy and Dispensing A Ph A Washington meeting 1934

mum effect with a minimum irritation In such a medicament the crystals must be small and uniform and readily suspended upon agitation If the crystals are too large they will irritate the surrounding tissue producing fibrosus and induration If they tend to clump they form irritating masses with the same effect In either case absorption is materially interfered with On the other hand if a uniform suspension cannot be obtained, it is impossible to withdraw a sample containing the proper dose of bismuth

The examination of bismuth subsalicylate suspensions therefore consists of two types of analysis, chemical and microscopic The former is a quantitative determination of bismuth as set forth in the official assay, the latter method is here described The sample is thoroughly agitated to produce a uniform appearance of suspension, and a thin glass rod is used to secure a drop and transfer it to a slide A cover glass is immediately placed on top of the drop of suspension and gently rotated and pressed until a thin uniform smear lies between the slide and the cover slip These smears are then examined under a magnification of about 450 diameters The number and size of clumped areas may serve as a basis for a system of grading such as is used for milk sediments, or permanent records may be made by taking photomicrographs

Six samples, representing well-known brands that are offered to the physician in Maryland, were analyzed by the foregoing procedure In every case the quantitative requirements for bismuth were met, however the microscopic fields varied considerably One sample was superior to all the rest, four samples were given intermediate ratings, while still another was distinctly inferior Thus the microscopic test demonstrates, that, in a group of bismuth subsalicylate preparations, all of which have essentially the same composition, and all of which meet the percentage requirements for active ingredient, there may still be a difference in quality and therapeutic efficacy based on physical properties of the suspended salt

---

PROBLEMS IN DENTAL PHARMACY *

BY A O MICKELSON [1]

To understand the pharmaceutical needs of the dental profession, not including prescription writing, necessitates a thorough understanding of modern dentistry The dentist's medicine cabinet for daily use and the pharmaceutical preparations and chemicals used in his laboratory work should be common knowledge to the pharmacist The dentist is constantly using acids, alkalies, oxidizing agents, reducing agents, solvents, abrasives, hæmostatics, antiseptics, germicides, anesthetics—local and general, analgesics, sedatives, hypnotics and tonics

A closer relationship between the two professions, discussing drugs or preparations used in dentistry, is undoubtedly the most effective way to understand the pharmaceutical needs of the dentist, and thus create new possibilities for professional pharmacy The interview with the dentist should not cover a general scope, but instead study a specific problem, study the problem with the aim of solving his problem with him Why should the pharmacist attempt to render

* Section on Practical Pharmacy and Dispensing A PH A, Washington meeting 1932

[1] Dean, School of Pharmacy North Pacific College of Oregon Portland

such a service to another profession? The answer is this The pharmacist is the counselor to the allied medical professions and the more efficient and extensive this service becomes the greater will be the demand and remuneration for the pharmacist In other words, the pharmacist must give professional service if he expects support from the correlated professions

Quoting from the cover of the A PH A JOURNAL, for February 1934, "Pharmacy Is Strengthened by That Which Makes It of Greater Service" A slogan on a publication by the Council on Dental Therapeutics, "We Serve Not for Our selves but for Dentistry" This slogan may apply to any profession The pharmacist is not serving the physician nor the dentist for the benefits to be derived for himself but for humanity, pharmacy and himself

The method of individual contact, and choosing or developing a specific problem is the method I have found most helpful The dental pharmacy problems are numerous—a new field full of possibilities The scope of dental pharmacy is evidenced by the extensive work that is being done by the Council on Dental Therapeutics The problem may require some cooperative research before it can be solved, but it is the solving of the technical and minute detail of a problem which give the most gratifying results The field of dental pharmacy is most interesting and especially to the pharmacist interested in professional pharmacy

The problems in Dental Pharmacy in this discussion have been suggested by personal contact with dentists There is a need for a general massing fluid to be used for incorporating various types of abrasives which are used in prophylactic work This massing fluid must possess the qualities of readily mixing with abrasives and with the desired amount of abrasive it should possess the quality of adhering sufficiently to the brush, rubber cup or whatever appliance may be used by the practitioner, as not to fly from the instrument as soon as the engine is in motion, throwing the abrasive powder on the clothing of the patient and the dentist It should readily disintegrate in water, it should have a pleasing taste, as well as being antiseptic to prevent infection During prophylactic treatment it is usual for the dentist to use more than one grade of abrasive The massing fluid should serve for any abrasive desired

The biggest problem confronting the dental profession is that of prescribing tonics which will build tooth structure in fetal life and in children, as well as tonics which will maintain tooth structure in permanent teeth Such tonics in conjunction with food and vitamins are indeed not impossible Considerable research work has been done by the dental profession, and favorable results have been reported in numerous cases There is no question that the minerals such as calcium and phosphorus put up in proper combination are of extreme value to proper development of deciduous teeth and permanent teeth, as well as aiding materially in the prevention of decay of permanent teeth It is evident that pharmacists can be most helpful in solving this problem

There is a demand for a suitable formula, highly germicidal in action, for the sterilization of dental instruments The sterilizing solution should be rapid in action, insuring complete sterilization in a few minutes' time without a corroding effect on the instruments The solution should be reasonably safe to use and nontoxic to human tissue

There are many individuals who fail to have their teeth cleaned and cared

for by the dentist at regular intervals, nor are they in the habit of using a tooth brush Under these conditions dense calcific deposit may form around the gum margins and on the teeth This is very difficult to remove A solvent which will penetrate and soften such densely glazed calcific deposits would be of use to the dental profession It must be taken into consideration that a solvent which would dissolve calcific deposits would also have a chemical action on the enamel of the teeth. However, a preparation in the hands of a skilful dentist would not come in direct contact with the enamel of the teeth

Dry-sockets are of common occurrence in the practice of dentistry, and at times very difficult to restore as well as most painful to the patient Help the dentist in your community solve his need for a treatment for dry-sockets

The problems in dental pharmacy are numerous We can only begin to realize the growing demand for dental pharmacy when we consider a national tentative curriculum in dentistry which includes subjects relating to treatment and diagnosis of abnormal conditions of the oral cavity as follows Bacteriology, Preventive (Hygiene), Physiological Chemistry, Materia Medica, Physiology, Pharmacodynamics, General Pathology, Oral Medicine (Pulp Canal), Oral Pathology, Prevention (Nutrition), Diagnosis, Anesthesia, Oral Surgery, Oral Medicine, Principles of Medicine

A curriculum including subjects as those mentioned gives us a picture of future dentistry The dental profession is aware of the importance of their specialized branch of medicine in the prevention of disease and restoration of the teeth We must contribute our part to the advancing profession if we are to maintain our recognition as professional men serving the needs of the correlated medical professions

---

A STUDY OF VEHICLES FOR MEDICINES *

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

VIII THE GLYCYRRHIZA VEHICLES

That glycyrrhiza is a valuable disguising agent may be gathered merely from the extensive usage of at least some of its preparations In Professor Gathercoal's (1) report this is given as follows

	Usage per 10 000 Rs.
Syrup of Glycyrrhiza, N F	14 8
Fluidextract of Glycyrrhiza, U S P	11 2
Elixir of Glycyrrhiza U S P	2 6
Fluidglycerate of Glycyrrhiza, N F	0 0
Aqueous Elixir of Glycyrrhiza N F	0 0

The remarkable validity of this verdict of the medical profession, as expressed by the relative frequency of use of these preparations, will become clear by the perusal of this study

* From the Laboratory of Pharmacology, University of Illinois, College of Medicine

THE DISGUISING OF SALTY TASTES

Experiment 1

(a) Dissolve 0 5 Gm of sodium bromide in 5 cc of Syrup
(b) Dissolve 0 5 Gm of sodium bromide in 5 cc of Fluidextract of Glycyrrhiza 1 part water 3 parts
(c) Dissolve 0 5 Gm of sodium bromide in 5 cc of Syrup of Glycyrrhiza

Those who taste the resulting solutions would, we believe, be in favor of the syrup of glycyrrhiza (*1c*) solution The bromide solution in syrup (*1a*) tastes more salty, and the saltiness lingers after the sweetness of the sugar has left the palate The fluidextract (*1b*) gives but little sweetness when the liquid enters the mouth, so that the saltiness predominates at first This is followed by a period of prolonged sweetness which outlasts the saltiness of the bromide The Syrup of Glycyrrhiza combines the immediate sweetness of the sugar solution with the prolonged sweetness of the glycyrrhiza

Experiment 2

Ammonium chloride, 0 30 Gm dissolved in 5 cc each of the three different solvents as above yields the same conclusion

Experiment 3

Potassium iodide, 0 30 Gm dissolved in 5 cc each of the above solvents, also verifies results obtained

Conclusion The Syrup of Glycyrrhiza is a better vehicle for halides (Experiments 1, 2 and 3) than is simple syrup or the Fluidextract of Glycyrrhiza

COLLOIDALITY LESSENS TASTE SENSATION

This disguising power of glycyrrhiza for saltiness appears to be more than a mere matter of sweetness because there seems to be less saltiness in the taste of, *e g*, the bromide glycyrrhiza preparations than in equivalent solutions not only in simple syrup, but also in such flavoring syrups as the Syrup of Raspberry and the Compound Syrup of Sarsaparilla There is apparently a loss of saline ions as far as taste sensation is concerned, and we attempted, by means of numerous experiments, to determine the reason for this loss

One's first guess might be that the colloid interfered with diffusion of the crystalloid True, established theory does not support this assumption We, nevertheless, performed diffusion experiments (using collodion and celloidin sacs) with methylene blue solution and conducted similar studies with bromide Whenever a difference was noted, this could always be ascribed to a leaky diffusion membrane We also studied the modification in the development of "Liesegang's rings" (2) produced by colloid, but likewise without sufficiently striking results That merely a difference in the rate of diffusion could hardly be the cause for the difference in taste might also have been obvious from the fact that the taste sensation is experienced immediately, while diffusion is a relatively slow process, at least as far as enabling one to demonstrate a difference by the experiments carried out

It may be that differences in surface tension might explain this interference with taste sensation Or, possibly, it might be due to adsorption of the saline ions by the colloid it being well known that, when colloid is present, it is most difficult to re

move the last traces of salt ions by diffusion No matter how the colloid acts, it is evident that *colloidality has disguising value*

THE BEST SOLVENT IS THE BEST VEHICLE

To test the disguising value of the Syrup of Glycyrrhiza as compared with the elixirs, we prepared the following solutions

Experiment 4

(*a*) Dissolve 0 5 Gm of sodium bromide in 5 cc of Syrup of Glycyrrhiza
(*b*) Dissolve 0 5 Gm of sodium bromide in 5 cc of Elixir of Glycyrrhiza
(*c*) Dissolve 0 5 Gm of sodium bromide in 5 cc of Aqueous Elixir of Glycyrrhiza
(*d*) Dissolve 0 5 Gm of sodium bromide in 5 cc of Aromatic Elixir

We believe that again the verdict would be in favor of the Syrup of Glycyrrhiza as compared with all of the elixir preparations The solution in Aqueous Elixir of Glycyrrhiza is less offensive than the solution in the Elixir of Glycyrrhiza and this is less offensive than the solution in the aromatic elixir It will be found that the bromide solution in syrup (*1a*) is more pleasant than are any of the alcoholic solutions, even though they contain glycyrrhiza, and the salty taste becomes progressively more noticeable with increase in alcohol concentration The probable explanation for the superiority of the aqueous over the alcoholic vehicle is to be found in the insolubility of sodium bromide in alcohol Evidently the presence of alcohol in the elixir makes the latter a poorer solvent than the watery medium of the tongue and palate It is well known that, when two different solvents compete for the same solute, the latter will rapidly enter the better solvent in greater proportion than the poorer solvent We might imagine, therefore, that the saline is quickly drawn from the alcohol containing solution into the more congenial aqueous medium of the mucous membrane The reason, probably, why the aqueous elixir of glycyrrhiza (containing less than 5% of alcohol) is so distinctly inferior in its disguising power for saline taste, lies in the relatively small proportion of glycyrrhiza contained in it We, therefore, believe that *it is a mistake to use elixirs for the disguising of water-soluble alcohol-insoluble salines* The relative disguising inefficiency of the aqueous elixir of glycyrrhiza as well as its very limited use justify the suggestion that it be deleted On the basis of observations such as the above and numerous others, we believe to be justified in pronouncing that, other things being equal, *the best solvent is the best vehicle* Conclusion the taste of the bromide in elixir is more offensive than that of a solution of bromide in Syrup of Glycyrrhiza

THE DISGUISING OF THE BITTER TASTE

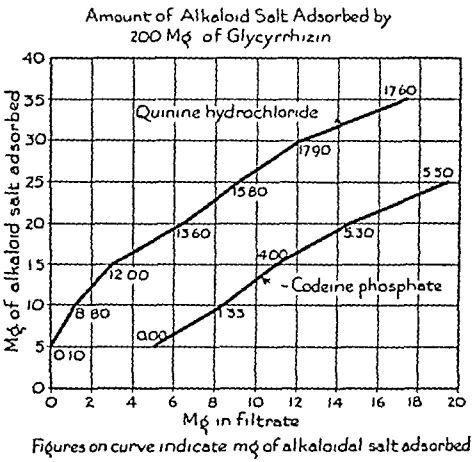
Experiment 5

(*a*) Dissolve 0 025 Gm of codeine phosphate in 5 cc of Syrup
(*b*) Dissolve 0 025 Gm of codeine phosphate in 5 cc of Syrup of Glycyrrhiza
(*c*) Dissolve 0 025 Gm of codeine phosphate in 5 cc of Aromatic Syrup of Eriodictyon
(*d*) Dissolve 0 025 Gm of codeine phosphate in 5 cc of Fluidextract of Glycyrrhiza and water, equal parts
(*e*) Dissolve 0 025 Gm of codeine phosphate in 5 cc of Elixir of Glycyrrhiza

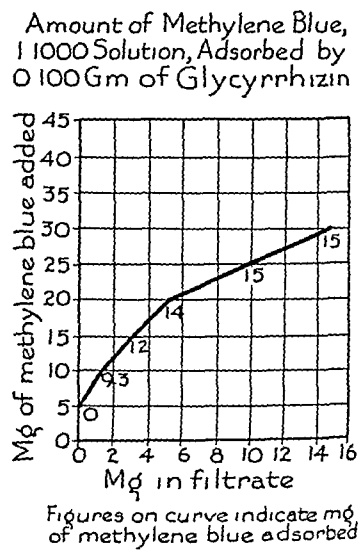
Again the solution in Syrup of Glycyrrhiza (*5b*) merits first place as far as palatability is concerned The Aromatic Syrup of Eriodictyon probably comes next

in order of pleasantness, but it is quite evident that the amount of codeine phosphate (0 025 Gm) exceeds the precipitating, hence the disguising power of the eriodictyon preparation In a previous study (3) we have found that 5 cc of the Aromatic Syrup of Eriodictyon were capable of disguising 0 008 Gm of codeine phosphate The subjoined Graph 1 gives the amount of codeine phosphate removed by glycyrrhizin from solutions of various strengths It shows that the adsorption power of glycyrrhizin for codeine is rather limited and definitely less than that of the resin of eriodictyon (cf 3) Nevertheless, its disguising power is obviously superior to that of eriodictyon, which must be due to the prolonged after sensation of sweetness produced by the glycyrrhizin, which is considered 150 times sweeter than sugar

As to the removal of quinine from solution, adsorption experiments (Graph 1) show glycyrrhizin to be again decidedly inferior to the eriodictyon resin, as it also



Graph 1



Graph 2

is in regard to the adsorption of methylene blue from solution (Graph 2) This is likewise borne out by tasting experiments Thus, a suspension of quinine ethyl carbonate (euquinine) in Syrup of Glycyrrhiza, while pleasant at first, becomes bitter soon thereafter and a prolonged bitter aftertaste is left Similarly, one fourth or one-half mg of strychnine sulphate added to Syrup of Glycyrrhiza, while pleasant at first, leaves a lingering bitter aftertaste We must conclude, therefore, that the Syrup of Glycyrrhiza is inferior to the Aromatic Syrup of Eriodictyon for the disguising of the bitter taste of alkaloids Neither glycyrrhiza nor eriodictyon are of any value for the disguising of the bitter taste of aloin

THE DISGUISING OF THE ALKALINE TASTE

Experiment 6

Dissolve (*a*) 0 60 Gm of potassium carbonate in 0 3 cc of water and add 5 cc of Syrup
(*b*) Repeat above and add Syrup of Glycyrrhiza instead of the Syrup
(*c*) Repeat above and add Aromatic Syrup of Eriodictyon instead of the Syrup

Again the Syrup of Glycyrrhiza gives the most pleasant disguise

THE DISGUISING OF THE SOUR TASTE

For the disguising of the sour taste glycyrrhiza is, of course, unsuitable, as the glycyrrhizin is precipitated by acid

VARIABILITY OF GLYCYRRHIZA PREPARATIONS

In view of the great disguising value of glycyrrhiza, the well-known variability of its preparations seems most unfortunate It is common experience, in their prescribing, that some patients like the medicine, while others complain of its "nastiness" That this is not due to taste idiosyncrasies of individuals, but to variability of the glycyrrhiza preparations, is suggested by the fact that patients sometimes complain the medicine tasted differently on refilling, as though the druggist "had made a mistake" Our studies show that there is actually an enormous difference between the palatability of supposedly equivalent preparations bought in the open market, as well as between preparations made in our laboratory by identical methods from different samples of the drug

TASTES OF VARIOUS SPECIMENS OF FLUIDEXTRACT OF GLYCYRRHIZA

Specimen	Prepared	Taste
1	In Laboratory	Sweet, slightly bitter
2	In Laboratory	Sweet, quite bitter
3	By Firm No 1	Bitter slightly sweet
4	By Firm No 2	Bitter sweet
5	By Firm No 3	Bitterish and flavor of scorching
6	By Firm No 4	Sweet, slightly bitter

Analogous differences were found in the Syrups of Glycyrrhiza made from these fluidextracts

SYRUP OF GLYCYRRHIZIN

The great variability of the glycyrrhiza preparations and the generally acknowledged difficulty of standardizing them, seems to us so serious an obstacle to their use as flavoring vehicles, that we undertook a great deal of experimentation with the view of discovering a method that would always yield a uniformly pleasant product We started these experiments with the active principle, glycyrrhizin The proportion of glycyrrhizin in glycyrrhiza is very variable, ranging from 6–14% No wonder, we thought, there is such variation in the taste of the glycyrrhiza products When we realize that, in addition to this, the sweetness of glycyrrhiza depends to a great extent upon the relative proportion of alkali metal, such as potassium, calcium or ammonium, with which the glycyrrhizin is associated, we can readily appreciate a reason for the difference in the taste of various specimens of rhizome from different sources as well as when they are kept in different ways It seems that some specimens of rhizome have undergone an actual souring from improper preservation We have found that the glycyrrhizin itself in such rhizomes is not changed, for though separated from even the bitterest fluidextract or rhizome, it is still capable of yielding a perfectly sweet product by combination with the proper amount of alkali Inasmuch as glycyrrhiza contains about 3% of a bitter principle, which is certainly undesirable in a vehicle intended to disguise a

bitter taste, it seemed quite logical to prepare the Syrup of Glycyrrhiza from the active principle, just as we no longer prepare syrup by extracting and evaporating beet juice or sugar cane juice

We found that the ammoniated glycyrrhizin is not as pleasantly sweet nor as colloidal as a more acid combination, *i e*, one containing a smaller relative proportion of ammonium hydroxide After experimenting with various proportions of glycyrrhizin and diluted ammonia water, the best results were secured by a proportion of 1 part of glycyrrhizin to 4 5 parts of *N*/10 ammonium hydroxide This yields so colloidal a liquid that a syrup made with 1% of the glycyrrhizin thus prepared becomes gelatinous Owing to this high degree of colloidality we cannot employ more than $^1/_2$% of the glycyrrhizin in this combination This is from $^1/_3$ to $^1/_7$ the amount of glycyrrhizin in its native, less colloidal state in the syrup made from the fluidextract And yet this syrup of glycyrrhizin is quite efficient in the disguising of salines This might serve as another proof of the idea, previously expressed, that it is the colloidality upon which the disguising power of these preparations for salines partly depends

We employed the following formula for the preparation of the syrup of glycyrrhizin

SYRUP OF GLYCYRRHIZIN

Glycyrrhizin	5 0 Gm
N/10 Ammonium Hydroxide Volumetric Solution	22 5 cc
Distilled Water	40 0 cc
Syrup, a sufficient quantity	
To make	1000 0 cc

Triturate the glycyrrhizin with the distilled water and, while actively triturating, add the *N*/10 ammonium hydroxide and triturate until solution is effected Then add enough of the syrup to make 1000 cc and mix thoroughly

At first thought this formula might be criticized as too expensive for consideration, owing to the high market price of glycyrrhizin, which is quoted at $4 40 a pound, or let us say, at about one cent per Gm This would, however, make the glycyrrhizin cost five cents per 1000 cc of the syrup, as against over sixty cents for the fluidextract or seventy cents for the fluidglycerate, which shows that the syrup of glycyrrhizin actually costs one-twelfth as much as far as the glycyrrhiza addition is concerned Inasmuch as glycyrrhizin could not be secured in the market, we prepared it either from the ammoniated glycyrrhizin or, what is much more economic, from the drug itself For this purpose, a concentrated aqueous percolate is acidified with hydrochloric acid The precipitate is washed by repeated decantation until free from chloride ions, as indicated by Silver Nitrate T S , and dried at moderate temperature

Unfortunately, the Syrup of Glycyrrhizin is so colloidal that it is "salted out" by the addition of bromide, which makes it turbid immediately and causes a deflocculation of the glycyrrhizin on standing We have not yet succeeded in determining what it is that keeps the glycyrrhizin from deflocculation when saline is added to a preparation made from the fluidextract Inasmuch as ammoniated glycyrrhizin, which is less colloidal, is also deflocculated, there is probably another reason than a difference in the relative proportion of glycyrrhizin and alkali We attempted to discover what it was in the extractives that kept from deflocculat

tion the glycyrrhizin in the syrup of glycyrrhiza, by adding the residue left after separation of the glycyrrhizin from extract of glycyrrhiza This, however, failed to stabilize the preparation It must be that the protective principle is denatured by the acid used in the separation of the glycyrrhizin

We believe that the syrup of glycyrrhizin has decided merit and that it might ultimately replace the cruder product, providing it can be suitably stabilized Owing to the advanced state of development of the forthcoming U S P and the N F revisions, we desire to have the privilege, which we also grant freely to others, to make further observations with syrup of glycyrrhizin before advocating introduction of a formula for it in one of our official books

AN IMPROVED FLUIDEXTRACT OF GLYCYRRHIZA

In the present state of the glycyrrhiza situation, it seems that we must concentrate our efforts upon minimizing the nastiness and the variability of the glycyrrhiza preparation from which the Syrup of Glycyrrhiza is to be made It is, in point of fact, being prepared from the fluidextract now, even though the N F specifies that it be made from the fluidglycerate The reason we believe this to be the case is that the fluidglycerate is not kept in drug stores, that, indeed, it is not even upon the market, and that manufacturers had to prepare it specially for us when we insisted upon ordering it As the specimens of fluidglycerate are just as variable as are those of the fluidextract, it presents no advantage from this standpoint, and furthermore it does not keep as well For these reasons, and especially on the basis of non-use we propose that the fluidglycerate be deleted from the National Formulary

It seems that the standardization of the Fluidextract of Glycyrrhiza from the standpoint of glycyrrhizin assay presents considerable difficulty as may be gathered from the literature on the subject (4–11) The simple methods are unreliable and the reliable methods, complicated Nevertheless, it should be easily possible to lessen the variability of the preparation, at least as far as the content of solid extractive is concerned This in preparations we have tested ranged between 20 and 30 per cent, as is shown by Table I

TABLE I —PERCENTAGE OF SOLID EXTRACT AND OF GLYCYRRHIZIN IN VARIOUS SPECIMENS OF FLUIDEXTRACT OF GLYCYRRHIZA

	Per Cent of Solid Extract	Per Cent of Glycyrrhizin in Extract	Per Cent of Glycyrrhizin in Fluidextract
Specimen 1	30	24 6	7 38
Specimen 2	27	24 2	6 54
Specimen 3	26	19 5	5 09
Specimen 4	25 7	23 1	5 94
Specimen 5	20	24 9	4 98
Specimen 6	23		
Specimen 7	25 4		
	Av 25 3		Av 5 98

NOTE We were unable to determine the amount of solid extract in two other commercial samples because they failed to dry after heating for five days The same difficulty was experienced with a fluidextract prepared in our laboratory by the U S P IX method, in which ammonia water was employed

It will be noted from Table I that, even though the amount of solid extract varied from 20 to 30 per cent, the average was practically 25 per cent It is of interest to note that the amount of glycyrrhizin present was in four of the instances exactly one-fourth the quantity of the dry extract For practical purposes, therefore, standardization in accordance with the amount of dry extract present in the fluidextract might suffice and the figure should be placed at 25 per cent

There are two ways by which we might develop a fluidextract of Glycyrrhiza of standard solid extract content

1 Exhaust the drug and concentrate the percolate to a somewhat greater extent than the ultimate bulk that the finished preparation is to have By determining the quantity of the solid extract in a portion of the liquid thus obtained and adding enough fluid to bring the total solid residue content up to the standard, the desired result would be secured What complicates the situation and makes the method just discussed unsuitable for the purpose is that the Fluid extract of Glycyrrhiza contains 25 per cent of alcohol and that the alcohol when added to the percolate produces a precipitate which is filtered out after sedimentation and decantation The alcohol would either have to be added before the final concentration, in which case it would be difficult to secure a standard proportion of alcohol in the finished product or else the alcohol would have to be added after standardization in which case it would render the previous determination invalid as the alcohol removes additional solid material from the preparation

2 The other method would be to dissolve the pure extract of glycyrrhiza, which contains a variable quantity (about 25%) of moisture, in a certain quantity of water an amount small enough so that the concentration will be excessive and dilution be required, adding the alcohol, separating the precipitate by sedimentation, decantation and filtration Then the percentage of dry residue is determined in a small portion of the fluid and the bulk is brought to the required amount to make the finished preparation carry 25 per cent of extractive by the addition of a sufficient quantity of a mixture of alcohol 1 part and water 3 parts This is obviously the method to be chosen

We, therefore, propose the following method for the preparation of the Fluidextract of Glycyrrhiza which we would like to submit to the U S P Revision Committee for consideration

FLUIDEXTRACTUM GLYCYRRHIZÆ

Fluidextract of Glycyrrhiza

Fldext Glycyrrh — Fluidextract of Licorice Root

The Fluidextract of Glycyrrhiza contains not less than 24% and not more than 26% of dry extractive The preparation should be of intensely sweet taste with but a slight tinge of bitterness, having the characteristic odor of glycyrrhiza and it should be free from even a suggestion of having become scorched in its preparation

Extract of Glycyrrhiza, Pure	**400 0 Gm**
Alcohol	
Water, of each a sufficient quantity	

Dissolve the pure extract of glycyrrhiza with the aid of the water bath in enough water to make the solution measure 750 cc Then add 250 cc of alcohol and agitate the mixture Set aside for 7 days, decant the clear liquid and filter the remainder Determine the amount of solid extractive in 5 cc of the liquid thus obtained by drying to constant weight From the weight obtained calculate the number of grams per 100 cc Calculate the quantity of solid extractive in the total quantity of liquid and add enough of a mixture of alcohol one part and water three parts to make the finished preparation contain exactly 25% of solid extract

In explanation of the process advocated it might be pointed out that the extract of glycyrrhiza should contain 25% of moisture, but that it may contain more or less In starting with an excess of the extract we save ourselves a preliminary determination of the dry extractive contained in it When we dissolve 400 0 Gm

of extract in 750 cc of water, we are certain that dilution will be ultimately required, so that we may add 250 cc of alcohol, confident that this will not be an excess, as the finished preparation will measure more than 1000 cc

AN IMPROVED EXTRACT OF GLYCYRRHIZA

We owe Dr Percy A Houseman the important information that the bitter principle of glycyrrhiza is extracted in much greater proportion toward the end of the percolation than in the beginning Before having been apprised of this we made the observation, without realizing its significance, that when we tasted the first portions of a percolate we thought we would this time get a very palatable product, only to be bitterly disappointed by the bitterness of the final preparation

When, for instance, we subject 200 Gm of glycyrrhiza to percolation, according to the directions of the U S P , but separate each successive 100-cc portion, we secure fractions with a progressively decreasing amount of dry extractive in each as shown in Table II

TABLE II

Percolate		Dry Extractive	Taste
100 cc portion	1	8 2188 Gm	Sweet
	2	9 3195 Gm	"
	3	6 2855 Gm	"
	4	5 0567 Gm	"
	5	4 3387 Gm	"
	6	4 3613 Gm	Sweet slightly acrid
	7	3 7498 Gm	"
	8	2 7183 Gm	"
	9	2 2088 Gm	"
	10	1 8353 Gm	Offensively acrid
	11	1 2655 Gm	" worse
	12	0 8989 Gm	"
	13	0 6730 Gm	"
	14	0 5160 Gm	"
250 cc final portion		1 1152 Gm	Bad
Total 1650 cc		52 5613 Gm	
		=26 28%	

It will be noted that the first 500 cc yield 33 2192 Gm of extractive or 16 6%, which is 63% of the total extractive, and has a sweet taste devoid of acridity

We, therefore, advocate consideration by the U S P Revision Committee of the following formula for the Pure Extract of Glycyrrhiza

EXTRACTUM GLYCYRRHIZÆ

Pure Extract of Glycyrrhiza

Ext Glycyrrh Pur	Pure Extract of Licorice Root
Glycyrrhiza, in coarse powder	1000 Gm
Boiling water, a sufficient quantity	

Moisten the drug with boiling water, and macerate in a covered container in a warm place for two hours Transfer the moist drug to a metal percolator (not iron) and percolate with boiling water until a yield of not over 150 Gm of extract on a dry basis is obtained, which is likely to be secured in the first 2500 cc of percolate Evaporate this percolate promptly on a water bath Not over 200 Gm of extract containing 25% moisture should be obtained

ALTERNATIVE FORMULA FOR AN IMPROVED FLUIDEXTRACT OF GLYCYRRHIZA

Should an alternative formula for the improved Fluidextract of Glycyrrhiza be desired in which the preparation is to be made from the crude drug, the following procedure might be considered

FLUIDEXTRACT OF GLYCYRRHIZA

Alternative Formula

Glycyrrhiza, in coarse powder	1000 Gm
Alcohol	
Water, a sufficient quantity	

Moisten the glycyrrhiza with 5000 cc of boiling water mix thoroughly and allow it to macerate in a covered container in a warm place for two hours Then transfer the moist drug to a tinned or enameled percolator and allow the percolation to proceed gradually adding boiling water until 2500 cc are obtained Evaporate the percolate on a water-bath or steam bath to 300 cc and when cold add 75 cc of alcohol and mix thoroughly Allow the product to stand for seven days in a stoppered container then decant the clear liquid, filter the remainder, and wash the residue on the filter with a sufficient quantity of a mixture of alcohol 1 part and water 3 parts to make the fluidextract measure 400 cc

Determine the amount of solid extractive in 5 cc of the liquid thus obtained by drying to constant weight From the amount obtained calculate the number of grams per 100 cc Calculate the quantity of extractive in the total quantity of liquid and add enough of a mixture of alcohol 1 part and water 3 parts to make the finished preparation contain 25% of solid extract

A "PALATABLE" SOLUTION OF CHLORAL HYDRATE

The disguising value of the Fluidextract of Glycyrrhiza is illustrated by the following prescription which yields the least offensive liquid administration form of chloral hydrate that we are acquainted with

℞	Chloral Hydrate	15 0 Gm
	Gluside	0 06 Gm
	Fluidextract of Glycyrrhiza	30 0 cc
	Syrup of Orange, to make	60 0 cc

M and label Teaspoonful in water at bedtime

The addition of sodium bromide is admissible as shown by the following prescription

℞	Chloral Hydrate	7 5 Gm
	Sodium Bromide	15 0 Gm
	Water	15 0 cc
	Gluside	0 06 Gm
	Fluidextract of Glycyrrhiza	30 0 cc
	Syrup of Orange, to make	60 0 cc

AROMATIC SYRUP OF GLYCYRRHIZA

We deplore the crudeness of the formula for the Syrup of Glycyrrhiza at present official in the N F Not only is there no possibility whatever for the prescriber to know whether the patient will receive a moderately pleasant or a nasty preparation, but, even granted that the most palatable glycyrrhiza product is used, the mere addition of syrup to it does not yield as pleasant a preparation as could easily be secured by the use of a little flavoring Every candy and chewing-gum manufacturer knows that the glycyrrhiza flavor needs to be improved by an anise bouquet Our formulary does not make use of this knowledge In experimenting to determine the most desirable flavor of glycyrrhiza, we find, after a trial of many

different formulas and proportions, that the anise flavor by itself is not sufficiently pleasing to be satisfactory It is much improved by the addition of a suitable proportion of oil of fennel If equal parts of oil of anise and oil of fennel are mixed, the anise flavor is almost completely overwhelmed by the fennel The most acceptable proportion seems to be 7 parts of oil of anise and 1 part of oil of fennel Even this combination is not perfectly satisfactory It has what might possibly be called a "musty" smell In looking over formulas for anise bouquets, we find that this evidently is very generally recognized, for all such formulas contain some additional flavor, the function of which seems to be to add "liveliness" to the bouquet We find oil of bitter almond, oil of spearmint and even nitrous ether used for this purpose To us the bouquet of the N F Elixir of Anise seems to be the most desirable

SYRUPUS GLYCYRRHIZÆ AROMATICUS

Aromatic Syrup of Glycyrrhiza

Syr Glycyrrh Arom

Oil of Fennel	0 05 cc
Anethol	0 50 cc
Benzaldehyde	0 015 cc
Fluidextract of Glycyrrhiza	250 cc
Syrup, a sufficient quantity, to make	1000 cc

Add the volatile oils to the Fluidextract of Glycyrrhiza and agitate until thoroughly mixed Then add enough of syrup to make the product measure 1000 cc

BROMIDE SYRUPS

To the prescribing physician these studies yield the practical result that Syrup of Glycyrrhiza, especially in its improved form, the Aromatic Syrup of Glycyrrhiza, yields a palatable preparation, when used as vehicle for bromide One might, therefore, suggest the following prescription

℞	Sodium Bromide	30 0 Gm
	Water, just enough for solution or	30 0 cc
	Aromatic Syrup of Glycyrrhiza to make	120 0 cc

M and label Teaspoonful in milk after meals and at bedtime

A parenthetic note might not be amiss, in this connection, to explain the consideration underlying the second line of the above prescription It is, of course, understood that the Syrup of Glycyrrhiza will not dissolve any considerable quantity of salt It is also well known that syrups are relatively permanent only as long as they are saturated solutions It is, therefore, necessary to add the minimal quantity of water that will dissolve the bromide so as to secure solution without dilution The determination of this quantity might well be left to the pharmacist who if necessary can easily refresh his memory as to the solubilities by consulting his reference books, while it is hardly to be expected that the physician should carry these figures in his mind

In this connection we would like to call attention to the joint responsibility of physician and pharmacist in the direction of delivering to the patient preparations that will keep without decomposition at ordinary room temperature It happens not infrequently that a medicine that lasts for several days or more has undergone fermentation and become effervescing, even to the extent as to blow out the stopper

Should this happen and the spoiled preparation be thrown away, it is even more fortunate than to have such a spoiled liquid forced down a child's unwilling throat, with possibly resultant digestive upset

INCOMPATIBILITIES

It might not be amiss at this point to recall to mind that glycyrrhiza has some of the following incompatibilities

1 Acids which precipitate the glycyrrhizin and destroy much of its sweetness
2 Alkalies which destroy the colloidality of the preparation
3 Heat which precipitates the glycyrrhizin
4 Ionized iron compounds, because of resultant colloidal precipitate Slightly ionized iron salts like iron and ammonium citrate may be added without precipitation

CONCLUSIONS

1 Glycyrrhiza is especially useful for the disguising of salines given in moderate dosage

2 It is generally less efficient than eriodictyon for the disguising of the taste of alkaloids

3 It is of but limited efficiency in the disguising of alkalies

4 Its disguising power is due to the colloidality and the sweetening property of glycyrrhizin

5 The Syrup of Glycyrrhiza is the most eligible of the glycyrrhiza preparations for disguising purposes in general

6 The N F Syrup of Glycyrrhiza could be very much improved by an anise bouquet and we advise its introduction and the change of the title to "aromatic syrup of glycyrrhiza"

7 Owing to variability in the glycyrrhiza rhizome, which may result in a bitter instead of a sweet preparation, formulas for an improved Extract of Glycyrrhiza and Fluidextract of Glycyrrhiza have been elaborated, and are submitted for possible inclusion in the Pharmacopœia

8 Other things being equal, the best solvent is the best vehicle Hence it is an error to add alcohol to water-soluble, alcohol-insoluble saline, such as bromide The taste of the bromide elixirs is more offensive than that of bromide syrups

9 The Fluidglycerate of Glycyrrhiza should be deleted from the National Formulary, and also the Aqueous Elixir of Glycyrrhiza, as neither of them are employed to a sufficient extent to justify their retention

REFERENCES

(1) E N Gathercoal, "The Prescription Ingredient Survey" AMERICAN PHARMACEUTICAL ASSOCIATION, Washington D C 1933
(2) Liesegang's Rings, 'Colloid Chemistry, Alexander," Vol 1 page 790
(3) B Fantus, JOUR A PH A 22 (April 1933) 323
(4) Percy A Houseman, *A J P*, 93 (1921), 484
(5) Percy A Houseman, JOUR A PH A, 9 (1920), 240
(6) A Linz, *Ibid*, 5 (1916), 196
(7) W Zimmermann, YEAR BOOK A PH A, 8 (1919) 78
(8) W Zimmermann *Apoth Ztg* 33 (1928), 319–320, 323–324
(9) Willy Peyer, *Chem Abs*, 19 (1925) 3144
(10) Ella Erickson, YEAR BOOK A PH A, 59 (1911) 250
(11) Evans Sons Lescher and Webb *Pharm Ztg* 54 (1911) 72 723, from *Chem Ztg*, 92 (1911) Through G B, A PH A, 59 (1911), 57

UNITED STATES PHARMACOPŒIA

ABSTRACT OF PROPOSED CHANGES WITH NEW STANDARDS AND DESCRIPTIONS ELEVENTH REVISION

PART I—INORGANIC CHEMICALS

The Pharmacopœial Convention of 1930 recommended that 'abstracts of changes proposed for the U S P XI and new standards and descriptions' be published before final adoption, that those who are not members of the Revision Committee may have an opportunity for comment and criticism

In compliance with this recommendation the following abstracts are submitted The nomenclature and the exact wording does not necessarily represent that to be finally adopted and doses have not been appended

Comments should be sent to the Chairman of the Revision Committee

E FULLERTON COOK,
43rd and Woodland Avenue,
Philadelphia Pa

I GENERAL TESTS

1 Hydrogen Ion Concentration—A chapter on Hydrogen Ions and p_H" has been prepared for inclusion in the section of the Pharmacopœia dealing with special tests This monograph treats in a general way the theoretical considerations involved and sets forth in detail the *colorimetric procedure* for the determination of p_H The *colorimetric method* has been adopted as the official procedure However, owing to the fact that in many of the colored solutions of the Pharmacopœia this method is inapplicable the potentiometric method is recognized as an alternative procedure A table is included containing the salt error corrections and, also, suitable directions for the preparation of buffer solutions and indicator solutions accompany the chapter

The advisability of incorporating a monograph of this kind into a modern pharmacopœia requires no defense Precedent has already been established by the British Pharmacopœia of 1932, which has included such a monograph The policy of Sub Committee No 7 in respect to the application of the principles of hydrogen ion concentration to Pharmacopœial substances warrants comment The Sub Committee has not employed statements of p_H in the individual monographs for informative purposes only If the information does not contribute to the tests for identity or purity, it has not been included in the official monograph When however, the information is useful as a means of identification or in establishing purity, the p_H of the substance has been included in the individual monograph For the purposes of increasing stability and pharmaceutical elegance, p_H adjustment has been included in certain monographs

In addition to the application of the foregoing policy of the Sub-Committee in respect to the individual monographs an informative table setting forth the p_H of many of the official drugs in aqueous solution will be included in the section of General Tests"

2 Electrolytic Determinations—The U S P X recognizes the electrolytic deposition methods as alternative analytical procedures for the determination of zinc, silver, mercury and copper salts After much discussion and experimental work, the Sub Committee decided to delete these electrolytic methods on the ground that the volumetric and gravimetric methods used to assay these salts were better suited for U S P purposes than the electrolytic procedures

3 Heavy Metals Test—With certain minor modifications this test has been recommended for U S P XI After mixing the hydrogen sulphide T S and the liquid in question the mixture is allowed to stand 10 minutes at room temperature instead of 30 minutes at 35° C before examining for the appearance of a brown to black coloration

4 Assay for Acids (Alkalimetric)—This general test has been deleted and more specific directions have been given under the individual acids

---

* Permission to reprint for purposes of comment can be had on application to the Chairman of the Board of Trustees James H Beal Fort Walton, Fla

5 *Assay for Chlorides, Bromides and Iodides* —This general test has been deleted and more specific directions have been included under the individual salts

6 *Assay for Alkali Benzoates and Salicylates* —This general test has been deleted and special assays included for sodium benzoate and salicylate under the individual monographs These assays depend upon the titration of the alkali bound to the organic acid with half normal acid in the presence of a large amount of ether Methyl orange T S is employed in the assay of sodium benzoate and Bromphenol Blue T S is used as the indicator in the assay of sodium salicylate The precipitated organic acid is instantly dissolved in the ether by vigorous stirring and hence the vitiating of the end point is obviated This procedure with certain minor modifications is essentially the process employed in the British Pharmacopœia of 1932

7 *The Arsenic Test* —The arsenic test has been changed in many of its minor descriptive details Throughout this revision an effort was made to harmonize the U S P test with the arsenic test description and directions set forth in the Book of Methods of the Association of Official Agricultural Chemists 3rd Edition (1930), page 307

Bettendorf's Arsenic Test has been deleted This is recognized in the U S P X for bismuth salts and antimony and potassium tartrate It was observed that the general arsenic test was applicable to bismuth salts Fleitmann s modification of the arsenic test has been included for antimony and potassium tartrate The method depends upon the generation of hydrogen in alkaline medium, under this condition, arsine is formed but stibine is not formed Hence antimony does not interfere in the test

8 *Turbidimetric and Clarity Tests* —Apparatus has been described and procedure outlined to determine the degree of turbidity in various preparations and solutions The sample is matched against suspensions of fuller's earth (200 powder) in distilled water Turbidities are expressed in parts per million A description of the turbidimeter is given by J R Bayliss, *Ind Eng Chem* 18 (1926), 311 and also Claman Carr and Krantz, JOUR A PH A , 21 (1932), 670

II GENERAL POLICIES

1 *Descriptive Matter in Monographs* —It was considered beyond the scope of the Pharmacopœia to include descriptive matter in the individual monographs which does not definitely contribute to the tests for identity or purity of the substances These statements, some of them carried in the texts for three or four revisions have been deleted To illustrate this point with a specific case, the following statement in the U S P X under Boric Acid has been deleted in its entirety

"Heated to 100° C , Boric Acid loses water forming metaboric acid (HBO_2) which slowly volatilizes at that temperature Heated to about 160° C Boric Acid fuses to a glassy mass of tetraboric or pyroboric acid ($H_2B_4O_7$) At about 185° C the fused mass swells, loses all of its water, and becomes boron trioxide (B_2O_3), which fuses into a transparent non volatile, hygroscopic mass "

2 *Concentration of Diluted Acids* —The concentration of diluted acids is now based on a weight to weight percentage For convenience in preparation, the concentration has been expressed on a weight to volume basis Therefore in the preparation of the diluted acids from the concentrated ones the retail pharmacist need only measure a definite volume of the concentrated acid (corresponding to a definite weight) and make up to volume with distilled water

3 *Working Formulas* —Many working formulas for the preparation of inorganic chemicals have been deleted It is believed that such substances as precipitated sulphur, exsiccated alum and granulated ferrous sulphate are not prepared by the small prescription counter methods any longer and, therefore the recognition of these working formulas has outlived its usefulness

III INDIVIDUAL MONOGRAPHS

1 *Acidum Boricum* —The assay of boric acid has been modified by the addition of another 50 cc of glycerin when the end point of the titration is reached and then titrating further to the production of the pink color with phenolphthalein Results obtained by this modified method are somewhat higher than those obtained by the U S P X method and agree more closely with the theoretical value

2 *Acidum Hydriodicum Dilutum*—The working formula has been deleted If this formula were retained, any sample of the acid which did not contain potassium acid tartrate, which remains as an impurity in the acid made by the official process would be considered illegal This view is taken owing to the ruling of the courts The official definition contains also the statement "Diluted Hydriodic Acid also contains not less than 0 6 Gm or more than 1 0 Gm of H H_3PO_2 in 100 cc" An assay for the hypophosphorous acid content is included also in the monographs

3 *Acidum Hydrochloricum*—To conform with the concentration of commercial acids the concentration has been changed from "31 to 33 per cent" to "35 to 38 per cent"

4 *Acidum Nitricum*—To conform with the concentration of commercial acids, the concentration has been changed from 67 to 69 per cent" to 67 to 70 per cent"

5 *Acidum Phosphoricum*—The argentimetric assay has been deleted The alkalimetric assay using phenolphthalein as an indicator and saturating the titration mixture with sodium chloride is included This assay is far more expeditious than the silver method and yields results sufficiently concordant for the purpose intended

6 *Acidum Sulphuricum*—To conform with the concentration of commercial acids the concentration has been changed from ' 93 to 95 per cent" to "93 to 97 per cent"

7 *Aqua*—A p_H range (5 6 to 8 3) has been included The test for oxidizable substances has been deleted This has been found to be unreliable when applied to various municipal-treated water supplies

8 *Aqua Destillata*—A p_H range (5 8 to 7 0) has been included The test for oxidizable substances has been deleted

9 *Arsenii Iodidum*—This substance is assayed in the U S P X argentimetrically An oxidizing titration with tenth normal iodine has been adopted This conforms with the assay for arsenous oxide and determines the trivalent arsenic present

10 *Arsenii Trioxidum*—The statement regarding the size of particles and physiological potency has been deleted

11 *Barii Sulphas*—The following Bulkiness of Powder ' test has been incorporated

'Place 5 Gm of Barium Sulphate previously sifted through a No 60 sieve, in a 50 cc graduated cylinder provided with a glass stopper The extent of the graduation of the cylinder should be about 14 cm Add distilled water until a 50 cc volume is obtained Agitate the mixture briskly for exactly one minute and set it aside for sedimentation Within fifteen minutes the Barium Sulphate should not settle below a volume of 12 cc (bulkiness of powder)"

12 *Calx*—Calcium oxide has been deleted and calcium hydroxide, for the preparation of lime water, has been included

13 *Calcii Bromidum*—The argentimetric assay has been deleted The substance is directed to be assayed by the oxalate, permanganate method now employed for calcium carbonate

14 *Calcii Chloridum*—The argentimetric assay has been deleted The substance is directed to be assayed by the oxalate permanganate method now employed for calcium carbonate

15 *Carbonii Dioxidum*—Carbon dioxide of medicinal purity (99 per cent CO_2) has been admitted The absence of carbon monoxide is required and an appropriate assay has been described

16 *Ferri et Ammonii Citras*—In the assay for iron in this substance a change in procedure has been adopted Instead of allowing the hydrochloric acid solution of the sample to remain in contact with the potassium iodide for 30 minutes at 40° C the titration of the iodine is begun without preliminary heating The results obtained by this modification are practically identical with those obtained by the more lengthy process

17 *Liquor Ferri Chloridum*—The indigocarmine test for nitrate has been added to replace the ferrous sulphate test

18 *Liquor Hydrogenii Dioxidi*—The purity rubric has been changed from not less than 3 per cent to not less than 2 5 Gm or more than 3 5 Gm of H_2O in each 100 cc

19 *Liquor Magnesii Citratis* (Description and Assay)—Minor modifications of the assay have been included The preliminary evaporation and carbonizing of the solution has been

omitted A maximum and minimum magnesium oxide content will be incorporated The (minimum total citric acid) test has been omitted An identity test for citric acid has been included An assay for the citric acid content has been included

20 Liquor Potassii Arsenitis —The maximum and minimum standards have been changed from 0 975 to 1 025 Gm of As_2O_3 to 0 950 to 1 050 Gm of As_2O_3 in each 100 cc

21 Magma Magnesiæ —The working formula has been omitted

Methyl orange T S has been replaced by methyl red T S in the limit of soluble alkalies test

The test for soluble salts and soluble alkalies has been modified

Limits of heavy metals and arsenic have been included

Limit of calcium test has been included

22 Magnesii Carbonas —The purity rubric has been changed from 'not less than 39.2 per cent MgO" to not less than 40 per cent or more than 42 per cent MgO

The limit of calcium oxide permitted to be present has been reduced from 0 8 per cent to 0 4 per cent The cumbersome oxalate precipitation method employed for the determination of calcium has been replaced by a simple calcium sulphate precipitation procedure

23 Magnesii Oxidum —The limit of calcium oxide permitted to be present has been reduced from 2 per cent to 1 per cent

The cumbersome oxalate precipitation method employed for the determination of calcium has been replaced by a simple calcium sulphate precipitation procedure

24 Massa Ferri Carbonatis (Definition and Assay) —The purity rubric of not less than 35 per cent of $FeCO_3$ has been changed to not less than 36 per cent and not more than 41 per cent of $FeCO_3$

Diphenylamine T S as an inside indicator in the assay has replaced potassium ferri cyanide as an outside indicator

25 Nitrogenii Monoxidum —The following purity rubric has been incorporated 'Nitrogen Monoxide contains not less than 97 per cent by volume of N_2O "

A test for the absence of oxidizing impurities has been included This test has been added to preclude the possibility of the higher oxides of nitrogen being present

A detailed description of an assay has been added This assay depends upon the differential solubility of N_2O in water contrasted with the solubilities of the generally occurring impurities

26 Oxygenium —The purity rubric has been increased from 98 per cent O by volume to 99 per cent O by volume

A test to identify the presence of traces of carbon monoxide in oxygen has been developed This test depends upon the reduction of iodine pentoxide and the detection of the liberated iodine Description of the apparatus and a diagram accompanies the test Carbon monoxide in concentrations of 1 to 100,000 are easily detectable by this method

The assay has been described in complete detail The alkaline pyrogallol absorption method has been replaced by the more easily manipulated ammonio-copper solution absorption method

27 Pilulæ Ferri Carbonatis (Assay) —Diluted phosphoric acid has been used in place of diluted sulphuric acid for the solution of the pills

Diphenylamine T S has been used as an inside indicator instead of potassium ferricyanide T S as an outside indicator, in the assay of these pills

28 Potassii Carbonas —The following test has been included to control the water content of the compound

"Dry about 3 Gm of Potassium carbonate, accurately weighed, to a constant weight at 180° C the loss is not less than 10 per cent or greater than 15 per cent (*water*) "

29 Potassii Hydroxidum —In addition to sticks and fused masses, pellets and other forms of KOH have been recognized

30 Potassii Iodidum —The argentimetric assay has been deleted The iodate direct titration method has been included This latter method is specific for iodides and thus eliminates bromides and chlorides

31 Sodii Benzoas—The statement 1 Gm of Sodium Benzoate is soluble in 61 cc of alcohol at 25° C has been changed to "1 Gm is soluble in 50 cc of a mixture of 47 5 cc of alcohol and 3 7 cc of distilled water at 25° C"

32 Sodii Biphosphas—This salt is assayed argentimetrically in the U S P X As with phosphoric acid this assay has been deleted and the alkalimetric procedure employed

33 Sodii Hydroxidum—In addition to the sticks and fused masses, pellets and other forms of NaOH have been recognized

34 Sodii Iodidum—The limit of water has been reduced from 7 per cent to 5 per cent

The argentimetric assay has been deleted The iodate direct titration method has been included The latter method is specific for iodides and thus eliminates bromides and chlorides

35 Sodii Nitris—The assay has been made to conform with the assay of ethyl and amyl nitrites This assay depends upon the liberation of iodine by the action of the nitrite on potassium iodide in the presence of sulphuric acid and the subsequent titration of the iodine with tenth normal sodium thiosulphate solution in an atmosphere of carbon dioxide

36 Sodii Phosphas—In place of the efflorescent duodekahydrated sodium phosphate, the more stable heptahydrate has been recognized

The official definition is

Sodium Phosphate when dried to a constant weight at 110° C contains not less than 98 per cent of Na_2HPO_4 It contains not more than 50 per cent of water"

The argentimetric assay has been deleted and the more accurate magnesium pyrophosphate gravimetric procedure has been included

37 Spiritus Ammoniæ Aromaticus (Definition and Assay)—The following definition has been included

"Aromatic Spirit of Ammonia contains in each 100 cc not less than 1 7 Gm and not more than 2 1 Gm of total ammonia and not less than 3 5 Gm or more than 4 5 Gm of normal ammonium carbonate $(NH_4)_2CO_3$"

The following assay has been included

'*Total Ammonia*—Measure accurately 10 cc of Aromatic Spirit of Ammonia into a 200-cc Erlenmeyer flask containing about 50 cc of distilled water Add 30 cc of half normal sulphuric acid and boil until the solution becomes clear Cool and titrate the excess of acid with half-normal sodium hydroxide using methyl red T S as an indicator Each cc of half normal sulphuric acid corresponds to 0 0850 Gm of NH_3'

'*Normal Ammonium Carbonate*—Introduce another 10 cc of the spirit, accurately measured, into a flask of about 300 cc capacity Add about 30 cc of half-normal sodium hydroxide and boil this mixture, replacing the water lost by evaporation, until the vapors no longer turn moist, red litmus paper blue Cool, add 6 drops of phenolphthalein T S and half normal sulphuric acid until the color of the phenolphthalein is just discharged Now add about 3 drops of methyl orange T S and titrate with half normal sulphuric acid Each cc of half normal sulphuric acid corresponds to 0 0480 Gm of $(NH_4)_2CO_3$'

38 Tinctura Ferri Chloridi (Assay, Description and Definition)—The official definition has been changed to read

"A hydro alcoholic solution containing about 13 Gm of ferric chloride ($FeCl_3$) in 100 cc corresponding to not less than 4 5 Gm per 100 cc of Fe"

The indigocarmine test for nitrate has been added to replace the ferrous sulphate test

The assay has been simplified according to the procedure set forth by Oakley and Krantz, Jour A Ph A 21 (1932), 468

In the continual study and scrutiny of the monographs up until the time of publication small changes in manipulation may be made and errors will be eliminated, but this survey contains the essential changes in the monographs reported

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note Could we confine our attention to the medicinals and preparations that are official in the U S P and N F, our teaching would be very much lightened It is disappointing to the young graduate to go into a prescription pharmacy and find that a great deal that he had learned about U S P and N F medicinals will be of little use to him because of the infrequent calls for them on prescriptions There is no question but that it has become incumbent upon our colleges of pharmacy to give considerable attention to non official medicinals if we wish our students to be successful in the prescription department It is difficult to determine just how much time should be given to a study of these preparations It is impossible to cover the total number thoroughly and the teacher must select for the purpose of study those that he thinks are most important The following papers by Professors Andrews and Clark will be of interest to those who are confronted with this problem —C B JORDAN, *Editor*

THE PLACE OF SYNTHETICS AND PROPRIETARY REMEDIES IN THE CURRICULUM OF A COLLEGE OF PHARMACY

BY A H CLARK *

In the recent Prescription Ingredient Survey by Gathercoal, it is shown that about one-third of all the different items occurring in prescriptions are proprietary When we consider that the average pharmacist sells many proprietaries that are never prescribed, it is safe to say that half the number of items sold are proprietary If we add to this a number of items that are listed in the Survey mentioned above as U S P or N F and which are really "synthetic" remedies, and the great number of synthetics that are used in hospitals and otherwise, and are not official in either the United States Pharmacopœia or National Formulary, the importance of a knowledge of these two classes of medicaments cannot be denied

Granting, then, its importance, how can such a subject be best handled in a college of pharmacy? There are no doubt various ways that will prove satisfactory, and no doubt the method must vary with varying conditions in the different institutions The writer wishes to express his views in the hope that some may have their interest stimulated to such a point that they will undertake to give instructions in this line, and that the manner in which the subject is handled by him may prove helpful to others

The prime purpose of such a course should be to give the student an opportunity to acquire some knowledge of synthetic and proprietary remedies There are two ways to attain this end, the first one being to discuss all such medicaments in the regular courses in organic chemistry where they fit in with the subject matter of such a course Anything like a thorough treatment of proprietaries and synthetics greatly increases the hours devoted to the regular courses, which is objectionable in many cases Such a method is impractical in some cases, since the regular courses in organic chemistry are given by teachers unfamiliar with the special pharmaceutical aspects of the subject Furthermore, such a method does not

* Professor of Chemistry, University of Illinois School of Pharmacy

sufficiently emphasize the subject of synthetics and proprietaries, and students fail to get an appreciation of its value and are unable to remember the desirable things because they are subordinated to the general topic of organic chemistry

The second, and by far the most satisfactory method, is to present the subject in a special course, and here two lines of action are open In either case the subject should be presented after the regular courses in organic chemistry are finished One method is to group these medicaments according to their therapeutic action The writer has tried this and while it is very acceptable to medical students it lacks many of the advantages of the method followed for many years which is given below

These medicaments are classified according to their constitution, and arranged in groups, according to the system of grouping used by most organic texts Since a student has a knowledge of the entire field of organic chemistry, both aliphatic and aromatic substances may be grouped together, for example *all* the aldehydes, acids, alcohols, etc , may be studied at once and their properties compared If a medicament is heterogeneous in character, it may be placed in any one of several groups according to the teacher's best judgment If it is a pharmaceutical mixture it may be treated under the group to which its most important constituent belongs A great deal of latitude is allowed in this classification, as for example, chloral may be treated among the aldehydes, or the halogen derivatives, as may seem desirable Barbiturates may be discussed under urea derivatives, or given a special class Arsenicals may all be treated in one group, or the various types under their particular class Very frequently a combination of chemical and therapeutic character is desirable as in the case of local anesthetics

The writer has found the greatest advantage of this mode of treatment, regardless of the finer details upon which there is much room for differences of opinion, to lie in the fact that when it is given to senior students, it affords a most excellent method for review of the entire field of organic chemistry By emphasizing the relationships of these medicaments to the various classes of organic substances, and the fact that their properties are usually due to the characteristic class structures present, the student must refresh his mind about these properties in order to see the connection Finally, as time permits, there is no limit to the interesting discussions of the relationship between therapeutic activity and chemical constitution that may be introduced in a course arranged in this way, and there is no branch of chemistry that lends itself to the seminar system of instruction so well as this does, providing the class is not too large There is no limit to the interesting discussions, investigations, reports, outside assignments of work, library reading, etc , that a small group can indulge in, if wisely directed by the instructor in charge of such a seminar

---

METHOD OF APPROACH IN TEACHING THE PHARMACY OF NEW AND NON-OFFICIAL REMEDIES

BY MARVIN J ANDREWS *

For the past several decades, it seems that the chemical and pharmaceutical manufacturers have been trying to surpass one another in the production of new

* Assistant Professor of Pharmacy University of Maryland School of Pharmacy

remedies for nearly every disease from which mankind and other animals have been known to suffer For want of a better term, we usually refer to these products as "new and non-official remedies" Some of these so-called remedies have but little merit and physicians soon cease to prescribe them Others, which do have some real value as therapeutic agents, or are made to appear so through clever advertising, come into more or less general use Whether these products belong to the first or second group, the dispenser must know something about their pharmacy if he is to intelligently fill the prescriptions calling for them The method of approach to teaching this information to pharmacy students is the subject of this paper

At the University of Maryland School of Pharmacy instruction to this end is given in three different departments, namely, the departments of Chemistry, Pharmacology and Pharmacy This instruction is given primarily in the third year after the student has had the basic courses in chemistry, pharmacy and the biological sciences which are necessary for a proper understanding of the subject

In the department of Chemistry, new and non-official remedies are considered along with the official products in a course entitled "Chemistry of Medicinal Products" This course is divided into two parts One part deals with natural products, such as fatty oils, resins, carbohydrates, volatile oils, alkaloids, glycosides, enzymes, glandular products and vitamins, and the other part deals primarily with synthetics, such as the hypnotics, anesthetics, antipyretics, analgesics, pressor drugs, etc

The department of Pharmacology limits the instruction which it gives covering these drugs and preparations to a consideration of their physiologic, pharmacologic, toxicologic and therapeutic properties For purposes of study the drugs are grouped according to the physiological action which is of greatest therapeutic importance, methods of administration and dosage are emphasized

In so far as the instruction in the pharmacy of these remedies is concerned, the approach is the same as that followed in giving instruction covering the official drugs and preparations In our courses in pharmacy and dispensing, the more important of these remedies are covered in those cases where these products can be conveniently grouped with the official products In attempting to do this, however, two main difficulties have been encountered In the first place, these remedies are so numerous that it is difficult to determine their relative importance and to make a representative selection In the second place it is often difficult, if not impossible, to obtain reliable information on the pharmacy of these remedies We have attempted to overcome these difficulties by using some one of the various textbooks on new remedies, such as, "The Chemistry of Synthetic Drugs" by Percy May, or "New and Nonofficial Remedies" issued by the American Medical Association as a basis for the selection of the remedies to be covered The time which can be devoted to instruction along these lines will not permit us to give consideration to more than a comparatively small number of these remedies A few of the most widely used of these preparations are selected from each group as represented by similarity in chemical composition or in physiological action Where information on the pharmacy of these products is not available in textbooks, we have searched through the journals for it and, in a few instances, we have conducted laboratory experiments to secure the desired information

As previously stated, our method of approach to instruction to the students in

the pharmacy of these remedies does not differ from the method employed in teaching the official drugs and preparations Our method of instructing students in dispensing may, however, have some points of interest for you

The prescriptions containing the drugs and preparations to be studied are first classified into groups according to "New and Non-official Remedies," such as anesthetics, barbital compounds, silver preparations, etc , after which the students are assigned this chapter or group for study prior to the lecture and recitation Whenever possible original packages of the material under discussion are shown the students during the lecture An attempt is made to select preparations that have been previously studied in chemistry and pharmacology

The prescriptions are placed in a baloptican projector and flashed on a silver screen in the front of the room in full view of the entire class They are then read and discussed by the professor in charge during the first few lecture periods, or until the students become accustomed to the procedure, after which the students are called upon to read and discuss them

In conclusion, the general procedure followed in the discussion of individual products may be summed up briefly by the use of the following example

Name of Article	Luminal Sodium
The Manufacturer	
Composition or Formula	The monosodium salt of phenylethylbarbituric acid (All other information of this character is taken up in the department of chemistry)
Description and Physical Properties	A white hygroscopic powder very soluble in water, soluble in alcohol, practically insoluble in ether and chloroform An aqueous solution of luminal sodium has an alkaline reaction to litmus
Actions and Uses	The same as those of phenolbarbital sedative or hypnotic (All other information of this character is taken up in the department of pharmacology)
Dosage	1/2 to 5 grains
Forms on the Market	Powder in 1/2- and 1 oz bottles Ampuls (powder) 2 and 5 grains Capsules—5 grains Tablets—1/4 1/2 and 1 1/2 grains
Incompatibilities	Is neutralized with free acid or acid solutions and the normal salt is precipitated in aqueous or low alcoholic solutions (For example Compound Elixir of Pepsin and Rennin, N F , which contains free lactic acid)

RESEARCH IN PHARMACEUTICAL EDUCATION *

BY WILLIAM J HUSA [1]

The interest which pharmacists have in educational matters was evidenced many years ago by the establishment of this Section Through the subsequent organization of the American Association of Colleges of Pharmacy and through the activities of the Committee on Educational Methods established by the National

* Section on Education and Legislation A PH A , Washington meeting 1934

[1] Head Professor of Pharmacy, University of Florida

Conference on Pharmaceutical Research further impetus has been given toward stimulating an interest in educational matters and building up a literature in this field

Over the years a great deal of attention has been given to improvements in curricula and teaching methods and to various matters of educational technique such as types of examination, honors courses, etc The interest in educational methods on the part of pharmacy teachers is very commendable, but there is one phase of pharmaceutical education whose paramount importance must never be lost sight of, *i e*, the correctness of the material that we teach If the facts we are teaching are incorrect, or the explanations we offer are erroneous or highly improbable, of what avail are all the theories of educational procedure?

Lack of sufficient training on the part of the teacher of course leads directly to poor teaching On one occasion in a court trial an instructor in a naval academy was questioned regarding his preparation in his field In his reply he admitted that he was not well versed in the subject he was teaching, but stated that he endeavored to be a fair referee between the student and the book In our field I recall the statement of a man who had had no training whatever in pharmacy, but who claimed that he could teach pharmacy, stating that if he got half a dozen pages ahead of the students they would never catch up with him

However, in fields of wide scope, such as we have in the pharmaceutical sciences, in which changes are constantly occurring due to changes in medical practice and to the discovery of new facts in the underlying sciences, it is a real problem, even for the well-trained teacher, to keep his courses strictly up-to-date

When teaching loads are heavy, and much time is required for routine clerical and committee work, and when a teacher is assigned to teach several branches in the field it becomes necessary to depend more and more on standard textbooks In any case the mis-statements and discrepancies found in text and reference books are a hindrance to good teaching In some instances such errors may be due to insufficient study of the literature on the part of the author Frequently the error is due to discrepancies in the literature itself, and to differences of opinion which cannot be resolved without further research Every pharmacy teacher should be constantly on the lookout for commonly accepted material which from his own special experience appears questionable If he goes a step further and carries out literature studies and research work to determine which facts are correct, he is taking a great step toward improvement of his teaching If he publishes his findings, thus making them generally available to his colleagues, he is making a definite contribution to pharmaceutical education

By way of illustration, I will cite an example from my own experience A few years ago I observed that contradictory statements appeared in various reference books regarding U S P Benzoinated Lard The supposed effect of benzoin in retarding the development of rancidity in lard was variously ascribed to the benzoic acid, cinnamic acid, volatile oil, resin and odorous constituents This lack of agreement led me to make a search of the journal literature on this point, this showed many conflicting opinions but very little careful experimental work With the assistance of co workers, I have carried out several experimental studies to clear up this point Our first work (1) showed that benzoic acid and cinnamic acids are not effective in retarding the rancidity of lard Incidentally, a study of

other reputed preservatives was made (2), these were found ineffective with the exception of hydroquinone, which in concentration of 0 5% reduced the rate of development of rancidity about 50% Although the value of benzoin as a preservative seemed well established in the older literature, some question arose on this point We then found by experimentation (3) that plain lard deteriorated several times as rapidly as benzoinated lard It was also found that benzoin was responsible for the change in color from white to gray which was observed in Ointment of Potassium Iodide, N F V Finally the individual constituents of Siam benzoin were tested one by one and it was found that coniferyl benzoate is the constituent responsible for the preservative effect of Siam benzoin in lard (4) We thus have gained a satisfactory understanding of this preparation, which is official in a dozen of the leading pharmacopœias of the world

The unsatisfactory statements in reference books regarding Solution of Arsenous and Mercuric Iodide, U S P X led to studies which I will mention briefly in passing Textbooks gave the impression that this solution contained a double compound of AsI_3 and HgI_2, while in reality it is a solution of arsenous acid, hydriodic acid and hydrogen mercuric iodide A leading textbook stated that there was no chemical reaction in the making of this preparation, while as a matter of fact there are extensive chemical changes involving practically complete hydrolysis of the arsenous iodide and the formation of a complex ion A leading reference book stated that the aqueous solution of arsenous iodide is neutral, whereas we found the p_H to be 1 2 By searching far enough back in the literature, we found that the acidity of the solution was known over a hundred years ago and this had repeatedly been verified by research workers since that time but these published researches were overlooked or disregarded by the "swivel-chair scientists" who made the pharmacopœias and other books

It is logical that research for teaching should be done in our colleges Some of the preparations which require study may derisively be called "antiquated solutions" or "stagecoach remedies" but as long as they remain official and must be included in our courses it is not to our credit to allow our knowledge and teaching to be inadequate and incorrect No one teacher has the ability to find all such discrepancies or the time to study all that he might see, but if more such studies are made by more teachers it will be possible to eliminate a great deal of misinformation from our textbooks and place the teaching of pharmacy on a higher level

REFERENCES

(1) William J Husa and Lydia M Husa, Jour A Ph A, 15 (1926) 1071–1074
(2) William J Husa and Lydia M Husa *Ibid*, 17 (1928), 243–247
(3) William J Husa, *Ibid* 19 (1930) 825–828
(4) William J Husa and Donald E Riley, *Ibid* 23 (1934), 544–550

School of Pharmacy
University of Florida
Gainesville, Florida

A REPORT ON INTER-PROFESSIONAL RELATIONSHIP WORK IN WISCONSIN *

BY RALPH W CLARK [1]

During the time since the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, two senior thesis students, Gerald Belisle and Wilbur Dehmer, a committee of the Wisconsin Pharmaceutical Association consisting of three physicians, three dentists and three pharmacists, and the writer have worked with some regularity on inter-professional relationship To start the work, a meeting was held in Madison during the AMERICAN PHARMACEUTICAL ASSOCIATION convention in order to familiarize the members of the state committee with the national scope of the problem and the character of the work being done, by hearing Dr Fantus and Dean Schicks speak on the physician and the dentist, respectively, in relation to the pharmacist

The relationship between the physician and the pharmacist was discussed in a paper by the writer, Wilbur Dehmer cooperating, in the January *Wisconsin Druggist* A full-page editorial in the *Wisconsin Medical Journal* for April commented favorably on this discussion and indicated the willingness of the physicians to cooperate The writer has been asked to contribute to the latter magazine

The relationship between the dentist and the pharmacist was presented in a paper by the writer, Gerald Belisle cooperating, in the April *Wisconsin Druggist*

A meeting of the inter-professional relationship committee was held in Milwaukee in January at which Dr Frank B Kirby addressed the group An informal discussion followed with druggists, physicians and dentists taking part The members of the executive committee and the officers of the Wisconsin Pharmaceutical Association were present and physician and dentist members of the committee and guests

An interesting program has been planned for the balance of the year Rho Chi sponsors an annual open spring meeting at the University of Wisconsin This year the meeting is to be turned into an inter-professional relationship discussion Dr Frank B Kirby, M D , director of Education of the Abbott Laboratories, H P Greeley, M D , Madison, member of the editorial board of the *Wisconsin Medical Journal*, O M Dresen, D D S , Milwaukee, practicing dentist and member of the faculty of the Marquette Dental College, and Otto H Berndt, president of the Wisconsin Pharmaceutical Association, will speak A meeting of the executive committee of the Wisconsin Pharmaceutical Association has been called in Madison on May 22nd,[2] to bring these men to attend the Rho Chi gathering University pharmacy students and local druggists, physicians and dentists are being invited Displays of interest to physicians and dentists will be shown

A portion of the Wisconsin Pharmaceutical Association convention program

* Section on Practical Pharmacy and Dispensing, A PH A , Washington meeting, 1934

[1] Instructor in Pharmacy, University of Wisconsin, Department of Pharmacy, Secretary, Wisconsin Pharmaceutical Association, Chairman, Committee on Inter-Professional Relationship of the Wisconsin Pharmaceutical Association

[2] The meeting has been held, but the paper is printed to present this type of work This meeting and similar ones he'd in other cities were well attended and were characterized by enthusiasm on the part of those present —EDITOR

is also to be given over to a similar discussion Following the writer's report of his committee work, Dr Kirby will speak He will be followed by Dr J C Sargent, M D , Milwaukee, a member of the committee and Dr Dresen, who has consented to appear on this program also This part of the convention program was considered by many who attended, as one of the high spots of a paper read by the writer at the State Medical Socie y meeting on September 12th

The above concludes the report of work done this year in Wisconsin on inter-professional relationship The writer wishes to add a few comments which may provoke discussion

The inter-professional relationship between physician and pharmacist has been a problem which has always occupied the minds of members of these professions Pharmaceutical journals of both the popular and professional types, as well as medical journals, have devoted many pages to the subject Recently, there has been a renewed and comprehensive attack on the relationship between these two kindred professions

The inter-professional relationship between dentist and pharmacist, on the other hand, has been discussed only, comparatively, recently Extensive work, in this field, has been done by George C Shicks, Assistant Dean, Rutgers University, College of Pharmacy, and others since 1930

Why not also include veterinarians? With the "back to horse" movement in farming territory, diseases and injuries to these as well as other domestic animals and pets call for medication which the small town druggist could and should prepare

The writer believes that the real problem is to get the pharmacist to approach the physician or dentist in the proper way, knowing first that his own house is in order This problem can be handled only by means of an educational campaign along these lines carried on in the pharmaceutical press Recently, a great amount of material has been contributed pointing out methods of approach but neglecting emphasis on the fact that the pharmacist must put his own house in order, which includes discontinuing, to a large extent, counter prescribing and featuring of patent medicines and solving the problem of irregular prescription prices Then, quoting Glenn Frank, "there is no reason why, as independent pharmacists, they should cease to be upstanding, independent factors in the economic life of this Commonwealth "

A serious obstacle to overcome is the fact that various pharmaceutical manufacturers detail physicians and dentists Members of these professions would welcome a visit from their favorite pharmacist who could in this manner reduce the number of preparations prescribed and carried on his shelves In the long run who would suffer? By and large, nobody A certain pharmaceutical house might conceivably lose out in one case and gain in another

In conclusion, the writer is of the opinion that although much can be done with this work by holding joint state and national meetings or as Dr Kirby suggests, joint conventions with sections for the various professions, the real, final work must be done by and between individuals

COMMITTEE REPORTS

REPORT OF THE FAIRCHILD SCHOLARSHIP COMMITTEE

The Fairchild Scholarship Committee of last year was composed of Robert L Swain, L D Havenhill, C T Gilbert and E G Eberle, Chairman As the term of the three former officers terminated in May, the Chairman mailed the Fairchild Scholarship letters to these members The Committee of this year is composed of Robert P Fischelis, Ernest Little, C H Evans and E G Eberle, Chairman The University of Notre Dame, School of Pharmacy, presented no candidate for the examination and the Head of the Department of Pharmacy, Dr Lawrence H Baldinger, with the assistance of other members of the faculty, consented to prepare the questions for the examination and grade the answers

Twenty nine candidates participated in the examination, representing nineteen schools

The examinations were given under three subjects Pharmacy, Chemistry and Materia Medica The highest general average was made in Pharmacy, 76 10, next in Materia Medica, 66 83, lowest, Chemistry, 54 17, general average, all subjects, 66 58 The highest per cent was made in Pharmacy, 92, next in Materia Medica, 91, next in Chemistry, 85 The lowest average was made in Chemistry, 28, next in Materia Medica, 49, next in Pharmacy 56 The general average in Pharmacy was 76 10, sixteen made above that average, twenty-two made 70 or over The general average in Materia Medica was 66 83, sixteen made above that average, fourteen made 70 or over The general average in Chemistry was 54 17, eleven made above that average, four made 70 or over The average of the general averages was 66 58, thirteen made above that average, ten made 70 or more

Candidates of the same school did not have closely related records nor did the two candidates rank next to each other

Scheduled report follows

Candidate	Pharmacy	Chemistry	Materia Medica	Average
1	86	85	91	87 1/3
2	83	83	76	80 2/3
3	80	79	76	78 1/3
4	92	76	60	76
5	88	58	81	75 2/3
6	78	63	84	75
7	86	67	71	74 2/3
8	78	61	82	73 2/3
9	89	50	77	72
10	67	69	75	70 1/3
11	76	53	79	69 1/3
12	80	55	69	68
13	70	52	79	67
14	76	54	68	66
15	84	46	68	66
16	74	57	61	64
17	79	47	66	64
18	75	46	70	63 2/3
19	84	52	55	63 2/3
20	75	53	60	62 2/3
21	87	40	59	62
22	72	47	66	61 -/3
23	82	38	62	60 2/3
24	67	34	75	58 2/3
25	56	46	71	57 2/3
26	63	43	65	57
27	58	51	49	52 2/3
28	62	38	57	52 1/3
29	60	28	62	50

The candidate making the highest record made a general average of 87 1/3 and the next in line made 80 2/3 The chairman of the Grading Committee Lawrence H Baldinger, Head of the Department of Pharmacy, University of Notre Dame, states The candidate who made the highest average wrote excellent papers in all of the subjects, papers which were consistent throughout His marks were the highest in Chemistry and Materia Medica, in Pharmacy, however, he rated about sixth, but his paper was nevertheless very good "

The report of the Grading Committee was submitted to the members of both committees referred to at the beginning and all the members voted to accept the report of the Grading Committee

The chairman desires to thank his colleagues for their support and the members of the Examining and Grading Committees for their helpfulness

The winning candidate is Frederick F Johnson, of the University of Washington College of Pharmacy, a sketch of the prize-winner follows

E G EBERLE, *Chairman*

SKETCH OF FAIRCHILD SCHOLAR 1934

Frederick F Johnson was born in Seattle Washington, May 17 1912 He is a graduate of Roosevelt High School of Seattle and entered the University of Washington College of Pharmacy in September 1930 He received the degree of Bachelor of Science in Pharmacy in June 1934

Mr Johnson was admitted to associate membership in Sigma Xi on his scholarship record He is a member of Rho Chi and was president of Rho chapter of Rho Chi during his senior year He was elected to the honor roll of the Linton Memorial for 1934 This memorial in the form of a plaque, was established by the local chapter of Kappa Psi fraternity in memory of the late Professor Arthur Linton He is a member of Phi Sigma Kappa social fraternity He was graduated with the rank of Ensign in the United States Naval Reserve after having spent four years in the Naval Reserve Training Corps of the University of Washington

Mr Johnson's avocation is music and his recreation is mountaineering He will register in the graduate school of the University of Washington this autumn as a candidate for the degree of Master of Science in Pharmacy and expects to continue graduate study for the degree of Doctor of Philosophy

The winner of the Fairchild Scholarship for 1934 is a son of Dean C W Johnson of the University of Washington College of Pharmacy

F F JOHNSON

PHARMACEUTICAL SERVICE IN THE BRITISH NAVY

The Pharmaceutical Service consists of the following grades (*a*) Head pharmacist, (*b*) superintending pharmacists, (*c*) senior pharmacists, (*d*) pharmacists The age of pharmacists on entry must not be less than twenty-one nor more than twenty eight years Candidates must possess certificates that they hold either the Major or the Minor qualification of the Pharmaceutical Society of Great Britain or the certificate of competency granted by the Pharmaceutical Society of Ireland, and produce testimonials and a full record of training qualifications and experience Pharmacists will be paid a salary of £120 per annum on entry, rising by £7 10s annually to £180 — From *Chemist and Druggist*

CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

R L Swain, *Chairman*
2411 North Charles Street
Baltimore, Maryland

M N Ford, *Secy-Treas*
State Office Bldg
Columbus, Ohio

TEMPORARY ABSENCE

under State Pharmacy Acts, as compiled by Chairman Swain

Alabama — temporary absence as defined and prescribed by the Board of Pharmacy

Arizona —By temporary absence is meant only those unavoidable absences which may occur during the day's work, and when the registered pharmacist in charge shall be within immediate call, ready and able to assume the direct supervision of said pharmacy

Arkansas —No provision

California —Temporary absence within the meaning of this act, shall be held to be only those unavoidable absences which may occur during a day s work and when the registered pharmacist in charge shall be within immediate call, ready and able to assume direct supervision of said pharmacy

Colorado —Temporary absence means absence of not more than eight hours out of a sixteen hour day, under the Rules and Regulations of the Colorado Board of Pharmacy

Connecticut.—*Provided for but not defined* By regulation of the Pharmacy Commission If a Pharmacy is conducted with only one licensed pharmacist engaged therein and in charge thereof and the absence of such licensed pharmacist from such store may become necessary for a greater period than one day such pharmacist or the owner of such store, may make application to the commission for and the commission may grant a leave of absence of such pharmacist for a reasonable temporary period greater than one day

Delaware —No provision

District of Columbia —No provision

Florida —No provision

Georgia —No provision

Idaho —The department of law enforcement may grant a permit to an assistant pharmacist for such time as the department may prescribe to conduct a drug store or pharmacy during the temporary absence of a regularly employed licensed pharmacist therein

Illinois —Any assistant pharmacist shall have the right to act as clerk or salesman in a drug store or pharmacy during the temporary absence of the registered pharmacist

Indiana —Temporary absence of a registered pharmacist shall be construed to mean that an assistant pharmacist may be left in personal charge of a registered pharmacy not more than two consecutive hours and not to exceed four hours in each twenty four hours

Iowa —"Temporary absence" shall mean necessary absence for meals and business or other necessary causes while the pharmacy is open for business

Kansas —No provision

Kentucky —Registered assistant pharmacist may have charge of a drug store during the temporary absence of the registered pharmacist, but such absence shall not be for a longer period than thirty days in a calendar year

Louisiana —No report

Maine —But such store may be under the charge of a qualified assistant during the temporary absence of such registered apothecary (Not otherwise defined)

Maryland —An assistant pharmacist shall not be left in charge of any pharmacy in this State for a period of more than twenty four hours and then acting only in the temporary absence of a registered pharmacist, regularly and continuously employed in that pharmacy

Massachusetts —No provision

Michigan —A registered assistant pharmacist may be employed in any pharmacy or drug store under the management and supervision of a registered pharmacist, and during his temporary absence therefrom (Not otherwise defined)

Minnesota.— or during the temporary absence of such registered pharmacist, in charge of a registered assistant pharmacist (Not otherwise defined)

Mississippi —No report

Missouri —No provision

Montana —No report

Nebraska —Temporary absence within the meaning of this act shall be held to be only those absences which may occur during a day s work and when the registered pharmacist in charge shall be within immediate call ready and able to assume the direct supervision of said pharmacy

New Hampshire —An assistant pharmacist may be left in charge of a pharmacy only during the temporary absence of a registered pharmacist, and such temporary absence shall in no case exceed forty eight hours at any one time, nor fourteen days in any one calendar year, unless consent is obtained from the commission

New Jersey —The term temporary absence as used in this section shall mean an absence of not more than four hours in any one day of twenty four hours

New Mexico —No provision

New York.—A junior pharmacist may subject to the rules of the Board, have temporary charge of a pharmacy or drug store, but during such temporary charge, shall not compound or dispense physicians' prescriptions

North Carolina —Provided, that during the temporary absence of the licensed pharmacist in charge of any pharmacy drug store or chemical store, a licensed assistant pharmacist may conduct or have charge of said store

The Board of Pharmacy of North Carolina gives the following interpretation The term temporary absence ' in the Pharmacy Act shall be held to mean that interval during the period the store is open for business, when the registered manager is out of the store but within call and ready to assume direct supervision of said pharmacy

The qualified assistant pharmacist may have charge of a retail drug store during such temporary absence of the registered pharmacist and exercise his right to do what the law and his certificate confer upon him

North Dakota — or during the temporary absence of such registered pharmacist, in charge of a registered assistant pharmacist

Ohio —No provision

Oklahoma — No provision

Oregon —Temporary absence within the meaning of this act shall be held to be only those unavoidable absences which may occur during a day's work and when the registered pharmacist in charge shall be within immediate call ready and able to assume the direct supervision of said pharmacy

Pennsylvania —An assistant pharmacist may also perform such duties during the temporary absence of the pharmacist regularly in charge

Rhode Island —No provision

South Carolina —The said Board shall make rules and regulations clearly defining temporary absence

South Dakota —Any registered assistant may take charge of the drug store or pharmacy during the temporary absence of the manager thereof Provided, that nothing in this section shall be construed as giving such assistant authority to perform continuously any of the duties herein mentioned, except under the supervision and in the presence of the manager

Tennessee —A registered assistant pharmacist shall have the right to fill prescriptions and dispense medicines in a drug store or pharmacy and during the temporary absence of the registered pharmacist in charge, provided such absence is not more than one third of the time per week that the store is open for business

Texas —No provision

Utah —Temporary absence within the meaning of this title, shall be held to be only those unavoidable absences which may occur during the day s work, not to exceed ten days and when the registered pharmacist in charge shall be within immediate call, ready and able to assume direct supervision of said pharmacy

Vermont.—No provision

Virginia — but during the temporary absence of such registered pharmacist a registered assistant pharmacist may act in place of the said registered pharmacist Board regu-

lations 2 (g) The term "temporary absence" as used in this act shall be construed to mean an absence from the pharmacy over which said registered pharmacist has personal supervision of less than one half the hours that said pharmacy is open to the public for business

Washington —Ruling of the Director of Licenses Temporary absence shall be held to be only those absences which may occur during a day's work, and when the registered pharmacist in charge shall be within immediate call ready and able to assume the direct supervision of said drug store or pharmacy

West Virginia —No provision

Wisconsin — a registered assistant pharmacist may have charge during the pharmacist's necessary absence, not to exceed ten days

Wyoming —No provision

Office of the Secretary,
September 7 1934

CONFERENCE OF STATE ASSOCIATIONS IN MIDWEST

The Midwest Conference of Pharmaceutical Associations was organized in Kansas City on September 3rd Officials of five Midwest states—Iowa, Missouri, Nebraska, Oklahoma and Kansas—were present The Colorado Pharmacal Association is expected to join the conference later, its officers being unable to attend this meeting An organization was perfected a Constitution and By-Laws adopted, officers elected and work started which is designed to be of benefit to the Independent Retail Druggists of these states

Incorporated in the By Laws is a clause which states the intent and purpose of the Conference One purpose is to aid, assist and cooperate with the National Associations at all times for the mutual interest of independent druggists Other purposes are to secure similar legislation in adjoining states and for the interchange of ideas and information valuable to the retail drug trade The Conference adopted a resolution to request the N A R D , at the New Orleans Convention, to approve and assist in organizing similar Conferences in other sections of the country It is expected that this Conference will show a fairly militant spirit in its operations

Officers elected were *President*, John W Slocum, Secretary of the Iowa Association, *Vice President*, Guy Butler, President Nebraska Association *Secretary-Treasurer* Roy C Reese, Secretary Kansas Association Others attending the Conference were President Otto Bjornstad Iowa Association, President Joe Knight, and Treasurer Murray Williams Missouri Association, Secretary J G McBride, Nebraska Association, Secretary E R Weaver Oklahoma Association President Otto Kuether and Treasurer Walter H Varnum Kansas Association

Future meetings are to be held quarterly

ROY C REESE, *Secretary-Treasurer*

SECTION OF ILLINOIS PHARMACY LAW WITH REFERENCE TO SUBSTITUTION

Section 14, Paragraph 2, of the Illinois Pharmacy Law provides as follows in regard to substitution

"Nor shall any druggist or other person being requested by means of a prescription, or in any manner, to sell, furnish, or compound any drug medicine, chemical or pharmaceutical preparation, substitute or cause to be substituted therefor without notification to the purchaser any other drug, medicine, chemical or pharmaceutical preparation Any person violating any provision of this section upon conviction shall be liable to all the costs of the action and all the expenses incurred by the State Board of Pharmacy in connection therewith and for the first offense shall be fined not less than ten dollars nor more than one hundred dollars, and for each subsequent offense shall be fined not less than seventy-five dollars nor more than one hundred and fifty dollars The State Board of Pharmacy is hereby empowered to employ an analyst or chemist expert, whose duty it shall be to examine into any claimed adulteration substitution or alteration or other violation hereof, and report upon the result of his investigation and if such report justify such action, the board shall cause the offender to be prosecuted"

Substitution of the sort covered by the state law is now a violation of the Retail Drug Code under the NRA and subject to action by the Code Authority—Editor C R D A News

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary, 2215 Constitution Avenue, Washington, D C

LETTER NO 4

August 28, 1934

To the Members of the Council

24 Local Secretary for 1934–1935 Dean A O Mickelsen of Portland is recommended for election as Local Secretary by those who have charge of arrangements for the 1935 meeting in Portland Dean Mickelsen is nominated as Local Secretary by E F Kelly If members of the Council desire to submit other nominations, it is requested that these be forwarded promptly in order that a vote may be called for as early as possible

25 Headquarters for the 1935 Meeting The local committee who have charge of arrangements for the meeting recommend that the Hotel Multnomah be chosen as headquarters This hotel is located at Fourth and Pine Streets, has eight stories, is a Class A fireproof, steel structure with 500 rooms, all outside, 400 of which have private baths or showers The hotel has garage service and has submitted the following rates

Room without bath—1 person	$1 75, 2 25, 3 00
Room without bath—2 persons	$2 25, 2 75, 3 50
Room with bath—1 person	$2 50, 3 00 4 00, 5 00, 6 00
Room with bath—2 persons	$3 50, 4 00 5 00, 6 00, 8 00
Room with bath—Twin beds	$5 00, 6 00, 8 00, 10 00
Suites—Parlor, bedroom and bath	$10 00, 12 00
Parlor, bedroom and bath twin beds	$12 00, 14 00, 16 00
PARTY BUSINESS, 10 or more—	
Single with bath	$2 50
Double with bath	$3 50 to $6 00
Twin beds with bath	$5 00 to $7 00

MAIN DINING ROOM, table d'hote, luncheon 65¢ to $1 00, also a la carte Dinner $1 00 to $1 50

COFFEE SHOP table d'hote and a la carte service at moderate prices

Dean Mickelsen has forwarded a plan of the mezzanine floor of this Hotel which shows ample accommodations as to meeting rooms, all on one floor, and so arranged that they can be easily located

26 Time of the 1935 Meeting The local committee recommends that the meeting be held either the week of August 5th or of August 12th and states that the average temperature for Portland on these dates is 67° The suggested dates were submitted to Secretary Christensen of the N A B P and to Chairman Jordan of the A A C P Secretary Christensen approved either date Chairman Jordan expressed satisfaction that the meeting is to be held earlier and the opinion that the week of August 12th would be more satisfactory because a number of schools and colleges of pharmacy hold summer sessions and it would be difficult for their representatives to reach Portland for the earlier date

Dean Jordan's statement was referred to Dean Mickelsen for consideration In the meantime the Oregon and Washington Pharmaceutical Associations have decided to hold their annual meetings for 1935 in Portland on Monday and Tuesday of the week of the A PH A meeting and the Idaho and Montana Pharmaceutical Associations are being invited to hold their meetings at the same time The meetings of the Oregon and Washington Pharmaceutical Associations will be held on Monday and Tuesday so that their members will be free to attend the A PH A sessions Wednesday, Thursday and Friday

President Perry of the Oregon Pharmaceutical Association has written that the annual Buyers' Week conducted by the two Portland drug wholesalers has been set for the week of

August 5th and urges that this week be chosen for the A PH A meeting since hundreds of drug store owners from Oregon, Washington, Idaho and even Alaska visit Portland for this Buyers' Week Dean Mickelsen and the Portland Chamber of Commerce, have written in support of the earlier date Dean Mickelsen advises that in case the earlier date is chosen, the Multnomah Hotel will give preference to our convention members as to rooms and meeting rooms so that the A PH A meeting will not be interfered with by the larger attendance

If the members of the Council have comments or suggestions please submit them promptly as a vote on the local secretary and on the time and headquarters for the meeting will be called for in about ten days

E F KELLY *Secretary*

LETTER NO 5

To the Members of the Council

27 Minutes of the First Meeting of the Council Motion No 1, Council Letter No 2, page 846 has received eleven affirmative votes and is carried President Fischelis is recorded as not voting

28 Committee on Maintenance Motion No 3 Council Letter No 3, page 849, has been carried and the appointments are approved

29 Election of Members Motion No 4, Council Letter No 3, page 849, has been carried and applicants numbered 1 to 41 inclusive, are declared elected

30 Joint Meeting Executive Committee N A R D and Council, A Ph A Secretary Dargavel has advised that the annual joint meeting will be held in the Hotel Roosevelt New Orleans La on Monday September 24th, at 10 30 A M All members of the Council are invited to be present and those who expect to attend are requested to notify the secretary as promptly as possible

The secretary was requested by Mr Dargavel to suggest the subjects which should be considered at this meeting and after consulting with the president and chairman of the Council wrote Mr Dargavel on August 31st as per copy attached Mr Dargavel has approved this list and advised that, for the present he has no additions to suggest

The secretary will appreciate an expression by letter of the views with respect to these subjects of those members of the Council who cannot attend the joint meeting

E F KELLY, *Secretary*

THE EDUCATION DEPARTMENT OF JAPAN ENCOURAGES SCIENTIFIC RESEARCH

The department of Education of Japan has decided to grant an official subsidy of 47 000 yen to encourage scientific research for the current year Among the persons who will receive subsidies for their research work are the following

Associate Professor Shigehiko Sugazawa (Dr of Pharmacy) of the Tokyo Imperial University for his study of papaverin compounds

Professor Takee Tsukamoto of the department of pharmacy in the Imperial College of Medicine at Kanazawa and his associate for his research into the decomposition of anæsthesin

Professor Etsuo Miyamichi of the Toyoma School of Pharmacy for his study of the disruption of unsaturated fatty acids

Professor Ryoji Sakai of the Kummamoto School of Pharmacy for his study of food substitutes

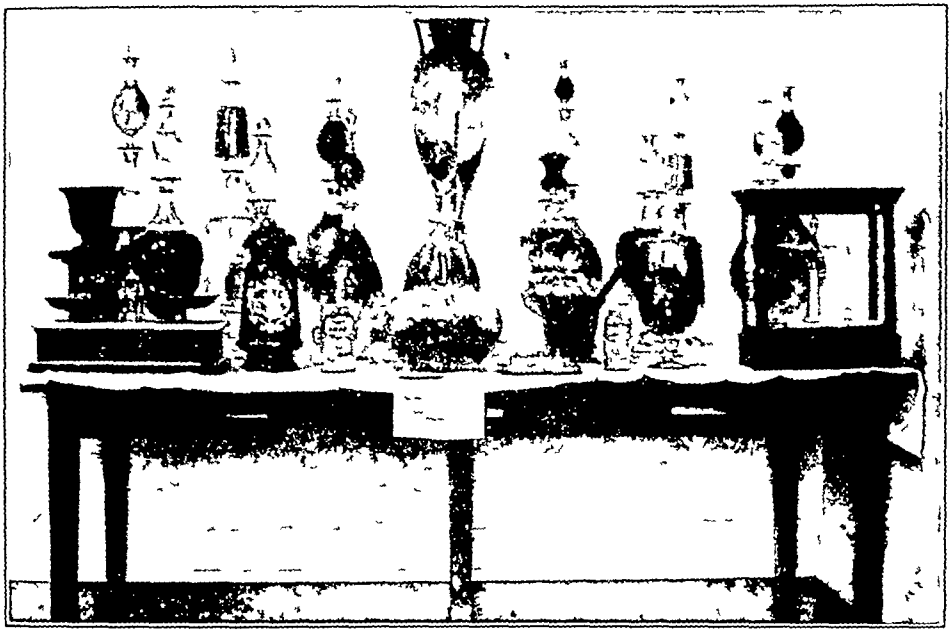
Professor Masanobu Teranishi of the Tokushima Technical Higher School for his study of the alkaloid contained by the root of *Orixa japonica*

The following persons are to receive subsidies for their studies of chemical problems

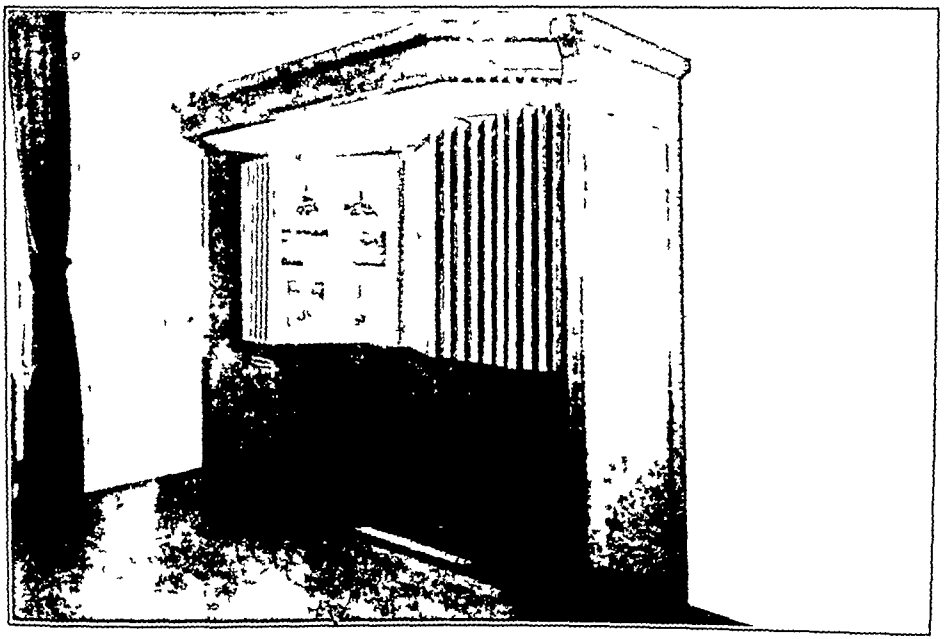
Professor Shoichiro Nagai of the Tokyo Imperial University for his investigation into the relations between the dissolvability of glass and chemical ingredients

Professor Seigo Minami of the Kyushu Imperial University for his study of the efficacy of vitamin D in skin diseases

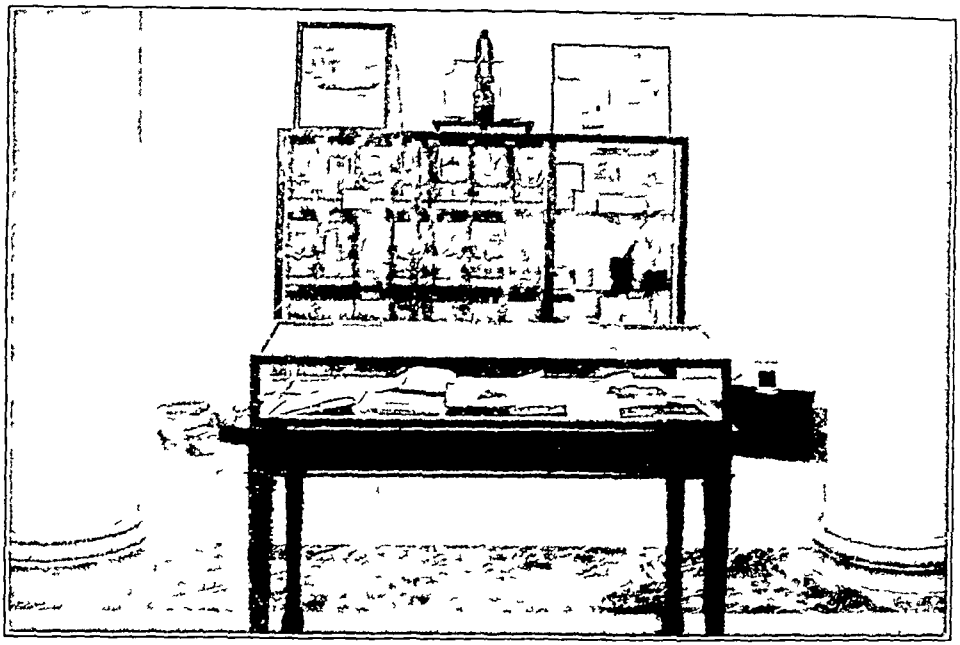
Professor Heihachi Yoshiamara of the Meiji College of Pharmacy for his study of *Ranunculaceæ* and related plants



Show globes bottles jars and balances presented by pharmacist Lawrence Williams of Baltimore Mr Williams has one of the largest collections of show globes in this country



The multiplex display fixture above and the photographs were presented by the University of Minnesota College of Pharmacy Frederick J Wulling Dean The illustrations are excellent and are displayed under twenty divisions including the drying ovens milling and cleaning apparatus, also green houses drug milling laboratory, medicinal plant laboratory, pharmacognosy laboratory pharmaceutical laboratory



A view in the Museum of the American Institute of Pharmacy AMERICAN PHARMACEUTICAL ASSOCIATION On top of the case, against the wall, is an early certificate of membership in the AMERICAN PHARMACEUTICAL ASSOCIATION of the late John F Hancock This design was discontinued

On the other side is displayed a frame of foreign prescriptions filled in the pharmacy of J Leon Lascoff and presented by him to the ASSOCIATION In the center, between the two frames, is a balance used in the pharmacy of the late John F Hancock of Baltimore

Inside the case are twenty-two large drug jars, presented by James E Hancock of Baltimore Each one of these jars has a coat of arms of a state, and the name of the drug is on the jar in gold leaf In the other part of the case is a mortar that came to Maryland more than three hundred years ago and belonged to the family of Governor Stone It was presented to the ASSOCIATION by Dr F B Tipton On the same shelf is a framed painting of Texas Bluebonnets presented by Austin pharmacists One of the lignum vitæ mortars was presented by Dr F B Tipton and the other by James E Hancock On the same shelf is a bottle with a chemical which probably, dates back to alchemical days, presented by Mrs H M Whelpley

In the front case is a display of National Formularies and photostatic copies of letters dating back to the Pharmacopœia of 1820 There is also a book of formulas compiled by Rev John Wesley, founder of the Methodist Church The book in the case is of the 26th edition showing that it had been quite widely distributed There are other items in the exhibit, which it is rather difficult to designate, except by viewing the display

SYNTHETIC RADIUM

According to Paris reports and *New York Times* press dispatch the discovery of synthetic radium has been made by the son-in law and daughter of the late Mme Curie, M and Mme Jean Joliot and is to be announced at an international gathering of scientists early next month in London

If the report is true, the discovery will be of immense importance in the fight against cancer, since it is stated that the artificial product is equally effective as natural radium and can be produced in large quantities comparatively cheaply The rarity and expensiveness of radium have greatly circumscribed its use in cancer work

M and Mme Joliot for years followed the work of Mme Curie and are now conducting the laboratory she founded in Paris

EDITORIAL NOTES

ELEMENT 91—PROTOACTINIUM

Element 91—named Protoactinium was isolated by Dr Aristid V Grosse at the Kaiser Wilhelm Institute, Berlin in 1927 The element was described in a paper, read by the discoverer, at the recent convention of the American Chemical Society in Cleveland Dr Grosse is now of the University of Chicago

CLAIM TO DISCOVERY OF ELEMENT 93 WITHDRAWN

There has been considerable interest in the announcement that Odolen Koblic director of the National Uranium and Radium Plant in Joachimsthal, Czechoslovakia, had discovered a new element, No 93, to which he proposed to give the name bohemium ' The steps by which the new element can be isolated as a silver salt appeared entirely logical and the working hypotheses sound Koblic presented his results in a clear straightforward manner, with unusually complete data even to an approximate atomic weight of 240

However, spectroscopic analyses made by experts both at Prague and Berlin show that the scientist was in error in identifying the heavy, difficultly soluble, brilliant yellow product which he isolated as element 93 Following the spectrum and X ray examination of the salt, it seems certain that it is silver tungstate and, agreeing with the interpretation of the analysis, Koblic has withdrawn his claim of discovery

In view of the straightforward manner in which this whole incident has come before us, one cannot avoid hoping that Koblic will continue in his research, and if there is an element No 93 to head the actinium series that he may be the one definitely to discover it —*News Edition, Industrial and Engineering Chemistry* (September 10 1934 page 318)

PHARMACEUTICAL EXHIBIT AT THE CONVENTION OF THE AMERICAN DENTAL ASSOCIATION

Sponsored jointly by the Revision Committees of the United States Pharmacopœia and National Formulary an exhibit of official medicines of interest to the dentist was shown at the American Dental Association annual meeting held in St Paul, Minnesota, August 6 to 10, 1934 More than 4000 dentists were registered They carried home the idea of Professional Pharmacy and its desire to cooperate in the practice of Dentistry The display consisted of a central section devoted to chemicals and galenicals official in the U S P and N F The display was prepared and exhibited by Prof R. E Terry of the College of Pharmacy of the University of Illinois

RECASTING THE NRA

The NRA is undergoing a change and that is in the direction of having General Johnson cooperate with others and do away with one-man rule It has been stated that the NRA will be patterned after the American government—executive legislative and judicial divisions, with the limits and boundaries of each clearly defined, the cooperation of industry and labor it is stated will be given positive and consistent direction

The NRA automatically expires June 16th, the President has announced that the basic ideas will be perpetuated, the problem is under consideration by him but few details of the proposed revision have been given out

Announcement has been made of the appointment of a General Code Authority to administer the basic code which covers the 252 industries that have no specific codes, the chairman of this body is Dr Willard Hotchkiss, president of the Armour Institute of Technology

THE LONDON PHARMACOPŒIA

The first London Pharmacopœia was published in 1618 An apothecary was not allowed to dispense or sell drugs unless these had been exposed to public gaze for a number of specified days and any physican had the right to prevent the apothecary from selling drugs or medicines which were in his opinion corrupt or decayed During the reign of James I a separate charter was granted and only practitioners in pharmacy were admitted to the apothecaries' guild

Between the years 1618–1851 thirteen editions of the London Pharmacopœia were published, each edition improved on the preceding There are several copies in the American Institute of Pharmacy, the earliest that of 1653

PERSONAL AND NEWS ITEMS

The Modern Hospital for August has an article An Affiliation Plan of Hospitals and the School of Pharmacy" by Dean Edward Spease, of the School of Pharmacy Western Reserve University Aside from giving the plan there are a number of excellent half-tones showing how the work of the hospital pharmacy is carried on

Matthias Noll, a verteran among Kansas pharmacists, several years ago, began collecting historical material relating to Kansas pharmacy This material has been collated and prepared in typewritten form with the purpose of preparing a printed volume dealing with historical pharmacy in Kansas

N G Hubbard, Birmingham, and John A Edwards, Anniston, have been appointed members of the Alabama Board of Pharmacy, the former succeeds Hal E Duncan, resigned and the latter succeeds the late W E Bingham Both of the appointees are active in Association work

Henry S Godshall, Lansdowne Pa , succeeds the late Raymond Hendrickson with Smith Kline & French Co Mr Godshall has been with the firm since his graduation in Pharmacy and is a member of the A PH A

Dr A R Bliss has been named director of the Birmingham Research Laboratories and elected professor of Pharmacology and dean of The School of Pharmacy of Howard College, Birmingham Ala

Sir Ronald Storrs, former military governor of Jerusalem, following the World War, was one of the visitors to register at the Pharmacy Exhibit in the Hall of Science at the Century of Progress Exposition General interest in the exhibit continues unabated with last Sunday one of the best days in the season from the point of registrations by physicians and pharmacists

Herbert Mayes former editor in chief of the *American Druggist,* has recently been promoted to the editorship of *Pictorial Review* He is succeeded on the *American Druggist* by Howard Stephenson, former managing editor with Samuel C Henry, former secretary of the N A R D , as associate editor

The new research laboratories of Messrs Eli Lilly & Co Indianapolis, will be formally opened with appropriate ceremonies on October 11th Sir Henry Dale will deliver the main address at the afternoon session Sir Frederick Banting and Dr Irving Langmuir will also speak At the dinner in the evening addresses will be made by Sir Henry Dale, Dr Elliott P Joslin, Dr George R Minot, Dr Frank R Lillie Dr Charles R Stockard, Dr George H Whipple, Dr Carl Voegtlin and Dr G H A Clowes, director of the Research Laboratories

S L Hilton has recently donated to the ASSOCIATION a number of volumes from his library and pharmaceutical, chemical and medical publications

Among recent visitors at the American Institute were A G DuMez, W F Rudd, A L I Winne, Ernest Little, Clyde W Graham Spokane, Paul E Eliason, Reno, Paul W Hildebrand Detroit, Robert William Rodman New York, W A Prout, Charleston, Ernest Bergeron Keen N H , Clyde S Wills Richmond Frequent visits are made by Washington pharmacists and quite a number of architects have inspected the building

F J Steele, of Bloomfield Pittsburgh, Pa has donated the following volumes for which the Association extends thanks 'A Manual of Microscopy,' L K Darbaker 'Notes on Equation Writing and Chemical and Pharmaceutical Arithmetic ' by J H Beal "The Pharmacist and Chemical Record" by N Gray Bartlett and Albert E Ebert Squibb's Materia Medica," 1906 Edition "North American Botany," by Amos Eaton and John Wright

Joseph Calloway Jr , who has been chief of the New York F D A station since April 1929 has been transferred to Baltimore, and Daniel W Walsh, chief of the Baltimore station since September 1920 will succeed Mr Calloway in New York

Mr Calloway's transfer to the chiefship of the Baltimore station has been at his own request according to W R M Wharton, chief of the Eastern district of the Food and Drug Administration The Eastern district embraces the stations in Atlanta Baltimore Boston, Buffalo New York and Philadelphia It is one of three districts of the administration and has its headquarters in New York

Victor E Levine, professor of biological chemistry and nutrition at Creighton University School of Medicine and Charles W Bauer, professor of chemistry at the School of Pharmacy, are spending four months in the Arctic in research among the Eskimo children They are making physical measurements and studies in nutrition An investigation will be made of the susceptibility of the Eskimo child to tuberculosis, diptheria and scarlet fever

OBITUARY

RAYMOND HENDRICKSON

Raymond Hendrickson Chester, Pa , member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1917, died suddenly while on his vacation in Ocean City, N J , on August 7th

Mr Hendrickson was born in California on November 12, 1878, but came east at an early age and entered the retail drug business He was graduated from the Philadelphia College of Pharmacy and Science in 1902 He successfully owned retail drug stores in Carlisle and Chester, which he sold at the time he entered the employ of Smith Kline & French Co , of Philadelphia

He was a charter member and one of the founders of the Phi Theta Sigma Fraternity and was an honorary member of the Holland Club of New York He was also a member of the Philadelphia Kiwanis Club Delaware County Druggists Association Philadelphia Association of Retail Druggists Pennsylvania Pharmaceutical Association Drug Club of Veterans Traveling Men s Association of the Pennsylvania Pharmaceutical Association and National Travel Club

Mr Hendrickson made his home at Twenty-first Street and Providence Avenue, Chester Pa He is survived by his widow and daughter Dorothy Jane Hendrickson

VAN AMBURG SANDLES

Van Amburg Sandles of McKees Rocks Pa member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1909 died Tuesday, August 14th He had been in ill health for about three years but was seriously ill only during the last two weeks

Mr Sandles was born at Wexford March 20, 1876 son of the late Mr and Mrs William H Sandles He was educated in the public schools of Beaver Falls afterward attended the Pittsburgh College of Pharmacy where he was graduated in 1896

Mr Sandles came to McKees Rocks in 1900 He was prominently identified with the business, religious and social life of the borough and community He operated a drug store at 1000 Chartiers Avenue since 1907 and was deeply interested in his profession He was a member of Allegheny County Retail Druggists' Association and the Pennsylvania Pharmaceutical Association, and a regular attendant at the annual conventions of the latter

He was a member of the Masonic bodies and of the Presbyterian Church of McKees Rocks Mr Sandles is survived by his widow Mrs V A Sandles and one son William W Sandles

We are advised of the death of the mother of our fellow-member, **Dr S E Massengill**, Bristol Tenn Mrs Massengill died September 6, 1934, aged 86 years

DEATH OF THE TREASURER OF THE BRITISH PHARMACEUTICAL SOCIETY

A H Jenkin, treasurer of the British Pharmaceutical Society since 1931, died suddenly on August 24th, of angina pectoris aged sixty-three years

During the war Mr Jenkin was one of the promoters of the Pharmacists' Volunteer Corps in which he was platoon commander He was active in pharmaceutical organizations and is known in connection with the case of Jenkin vs The British Pharmaceutical Society (1920)

The Jenkin Test Case

The suit was brought to test in court whether the British Pharmaceutical Society could engage in certain activities which seemed desirable to some The judgment declared that it was not within the objects, powers or purposes of the Society to undertake or perform any of the following

(1) To regulate the hours of business of members of the Society, (2) To regulate the wages and conditions of employment as between masters and their employees who are members of the Society, (3) To regulate the prices at which members shall sell their goods, and (4) To insure and to effect insurances of members of the Society against errors, neglect and misconduct of employees and against fire, burglary damage to plate glass, and generally against insurable risks or to spend any part of its funds upon the promotion, establishment and work of the Industrial Council Committee for the drug trade or industry "

One result of the *Test Case* was the formation of the Retail Pharmacists' Union —*Journal and Pharmacist* (September 1 1934)

For a number of years Mr Jenkin owned a pharmacy but for a longer period was engaged in hospital service, he served as chief pharmacist at the City of London and East London Dispensary until his death

SOCIETIES AND COLLEGES

DISTRICT OF COLUMBIA PHARMACEUTICAL ASSOCIATION

The election of officers of the District of Columbia Pharmaceutical Association will be held at its next session, in October The *President* of the Association is Bert A Smyser and the *Secretary* is Augustus C Taylor

DELAWARE STATE PHARMACEUTICAL SOCIETY

The forty eighth annual meeting of Delaware Pharmaceutical Society was held at Rehoboth Beach, June 27th–28th Among the speakers were Dr George L Secord and Andrew F Ludwig, President of the Maryland Pharmaceutical Association

The following officers were elected *President*, Harry Jones, Smyrna, *First Vice President*, George W Brittingham, Wilmington, *Second Vice President* William B Jester, Delaware City, *Third Vice President*, Edward J Elliott, Bridgeville, *Secretary* Albert Dougherty Wilmington, *Treasurer*, Albert Bunin, Wilmington

NEBRASKA PHARMACEUTICAL ASSOCIATION

Nebraska Pharmaceutical Association will hold its 1935 convention in Lincoln during the month of February while the State Legislature is in session Work on the program for the meeting is well under way

NEW JERSEY PHARMACEUTICAL ASSOCIATION

One of the most interesting conventions of the New Jersey Pharmaceutical Association, was held at Asbury Park, June 12th to 15th Among the speakers were President R P Fischelis of the AMERICAN PHARMACEUTICAL ASSOCIATION and Dr Ernest Little, of the Pharmacy Department Rutgers University

The report of the Committee on Pharmaceutical Education and Standards was presented by Chairman Fischelis

An interesting feature of the meeting was the presentation of the Pharmacy Week trophy donated by the Hudson County Retail Druggists Association and won by John H Hoagland of New Brunswick, of the features, one was the display of native medicinal drugs

The following officers were elected to serve for the ensuing year *President* David I Cohen, Jersey City, *First Vice-President*, Harry B Reibel Elizabeth, *Second Vice President*, Benjamin Schamach, Paterson, *Secretary*, Prescott R Loveland, 214 Chelsea National Bank Building, Atlantic City, *Treasurer*, Charles J McCloskey, Branchville

TENNESSEE PHARMACEUTICAL ASSOCIATION

Tennessee Pharmaceutical Association held an interesting meeting at Knoxville, July 17th to 19th The NRA was endorsed and a plan for constructive legislation was adopted The following officers were elected *President*, Robert R Ferrell Memphis, *First Vice President*, L S Elgin, Knoxville, *Second Vice President*, Phil P Vance, Chattanooga, *Third Vice-President*, Wm P Winter, Nashville, *Treasurer*, Homer J Berryhill, Jackson

At a meeting of the State Executive Board, held in Nashville, August 20th Tom C Sharp of Nashville was elected *Secretary*

TEXAS PHARMACEUTICAL ASSOCIATION

The Texas Druggist, official organ of the Association for September reports its 55th annual meeting The veterans elected Frank B Dwyer, with a business record of 56 years, president

A committee will be appointed by President Seeley for the purpose of studying the Pharmacy Law of Texas with a view of making such changes as will enhance public health and benefit all connected with pharmacy

Dr W J Danforth, Fort Worth, has been appointed field secretary, whose duty is to contact with Texas pharmacists

Lee Stinson now wears a past president's badge of Texas Pharmaceutical Association The members of the Executive Committee are *President*, A H Seeley, *Vice Chairman*, Shine Philips, John B Ray, Henry F Hein, H P Gaddis, E B Oliver, J C Frazier, Walter F Adams, *Secretary*

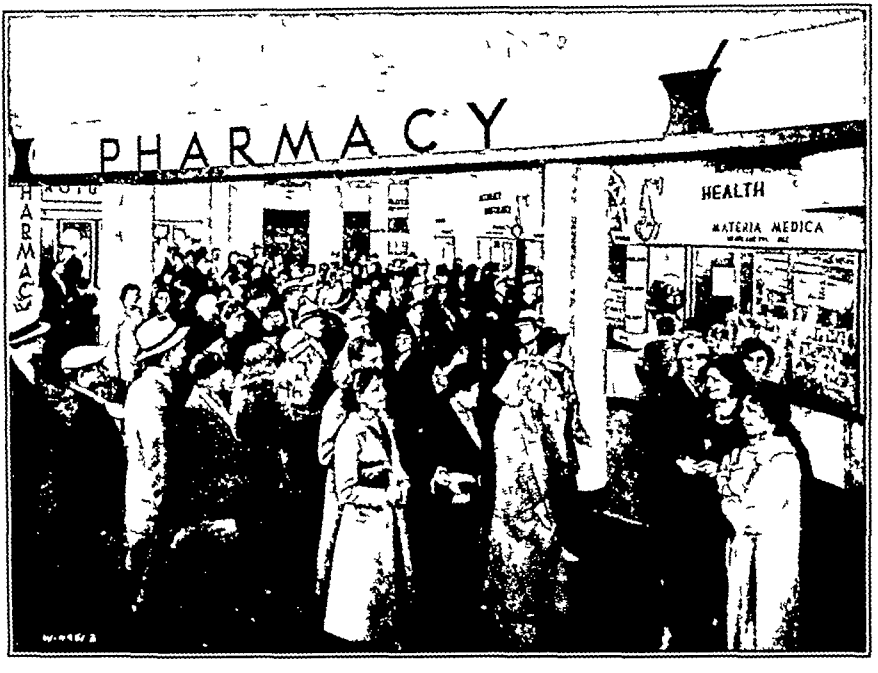
NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

Among the speakers invited to address the convention of the National Wholesale Druggists' Association to be held October 1st–6th, at White Sulphur Springs, W Va , are representatives of the Food and Drug Administration, the Federal Trade Commission and the Na-

tional Recovery Administration It is hoped that General Hugh S Johnson, National Recovery Administrator, will be present as a speaker

At the present convention, an innovation will be introduced In the past it has been the custom for chairmen of the various committees of the association to read detailed reports of their activities during the year preceding the convention At the present meeting, these reports will not be read, they will be printed and, as each visitor at the convention registers, he will be given a complete set of the reports

Reports which are controversial in any respect will be read in abstract at some of the sessions of the convention, to afford an opportunity for discussion and questioning from members listening in



Pharmacy Exhibit at Century of Progress

The photograph shown herewith was taken on September 17th (Constitution Day) While the number of visitors on this occasion was larger than usual, the average attendance at the Pharmacy Exhibit compared favorably with that of other exhibits and shows that the public is interested in the service of pharmacy

BARBITURIC ACID POISONING *

It is pointed out by Purves Stewart and Wilcox (London) that while there is no objection to the administration of barbiturates under medical supervision, their repeated daily administration over long periods in hypnotic doses is not always free from danger, and may induce toxic symptoms in the central nervous system Persons addicted to the daily use of these drugs not uncommonly take a dangerous overdose, accidentally or otherwise The barbiturates should be obtainable, they say, only on medical prescription which should not be repeated without authority Several cases are cited showing that acute barbitone coma is materially improved by cisternal drainage, a method which should be borne in mind as supplementary to other measures — *The Prescriber* (September 1934) 288

* J Purves Stewart and W Wilcox, Cisternal Drainage in Coma from Barbitone Poisoning ' *Lancet* (March 10 1934) 500–503

LEGAL AND LEGISLATIVE

THE CODE OF FAIR COMPETITION AMENDED

A public hearing was held on June 7, 1934 on the Amendment (Loss Limitation Provision) as signed April 8 1934—see April JOURNAL, A Ph A page 382 The National Retail Drug Code Authority requested a continuation of the Amendment with the elimination of the proviso referring to discounts, free deals and allowance This proviso has been omitted in the Amendment signed on September 21, 1934, which follows In its stead the Administrator is given certain powers to be exercised in any particular case where unfair advantage is being taken of the Amendment

AMENDMENT TO THE CODE OF FAIR COMPETITION FOR THE RETAIL TRADE—APPROVED SEPTEMBER 21, 1934 EFFECTIVE IMMEDIATELY

Section 6 of Schedule A" of the Code of Fair Competition for the Retail Trade as amended is hereby amended as follows

Section 6 It is hereby declared an unfair trade practice for any drug retailer to sell any drugs, medicines cosmetics toilet preparations or drug sundries at a price below the manufacturers' wholesale list price per dozen provided however, that in the case of biologicals or other of the above mentioned products which are not customarily sold in dozen or greater lots, the Code Authority may fix a comparable unit quantity

The Administrator at the recommendation of the National Retail Drug Code Authority or otherwise, after such notice and hearing as he may deem necessary may suspend or modify the operation of this clause at any time when it appears that such operation does not tend to effectuate the purposes of Title I of the Act The Administrator shall suspend or modify the operation of this clause in any particular case where a manufacturer is found to be manipulating his prices because of this provision in such a manner as to maintain an unwarrantedly higher price to the ultimate consumer or to oppress small enterprises, or otherwise to defeat the purposes of the Act

RELIEVES SMALL BUSINESS FROM PAYING MULTIPLE ASSESSMENTS

The National Recovery Administration has taken a further step toward relieving wholesalers and particularly small retailers, from paying multiple assessments An Administrative Order issued by the National Recovery Administrator puts a stop, until an improved formula can be worked out, to collections by Code Authorities governing one of wholesale or retail distribution from wholesalers or retailers who deal principally in some other line.

The variety of merchandise handled by the small local store, or the general store which sells 'anything the farmer needs"—types which are important factors in the total retail business—bring their operations under a number of Codes The local store owner has been harassed by demands to pay assessments to all of those Code Authorities Department stores and wholesale distributors also are importantly affected Under the order issued to day they will pay assessments only to the Code Authority for the Code governing their principal line of business, with few exceptions

PLAN TO MAKE ORDER PERMANENT

While the present order is temporary, the National Recovery Administration now is working out a plan to make permanent both its general principle and its main features The permanent plan will provide, at the same time, for the adequate support of Code Authorities governing the distribution of merchandise sold through stores handling other products as their principal line

It was pointed out that where a wholesaler or retailer is also engaged in some other line of business, such as manufacturing, this order will not prevent collection of assessment on the other business by the Code Authority for that business —From *Blue Eagle*

NEW JERSEY CODE

Article 9 of the New Jersey act would create an Industrial Advisory Council composed of five members to be appointed by the governor to represent labor, industry and the public One of the three representatives of the consuming public would be chairman of the group The council would act as a price fixing commission Upon petition from the administrator, it would investigate complaints of unfair competition This council would have the power to establish price fixing in industries in which investigation showed this method was necessary in order to protect the business of the industries' members

Another section of the act would authorize the administrator to appoint a planning and research division to analyze wage and labor conditions investigate and analyze costs of operation of trades and industries where minimum prices are requested cooperate with the Industrial Recovery Council and furnish statistical and other data to the Administrator

LIABILITY OF A DRUGGIST IN COMPOUNDING PRESCRIPTIONS

A physician prescribed for the plaintiff a 1 per cent solution of gentian violet, the written prescription directing the use of the solution as a mouth wash The physician, however, orally directed the plaintiff to use the solution in her eyes also The drug company to which the plaintiff took the prescription gave her, not a 1 per cent solution of gentian violet, but a 3 per cent solution, and this, when used as an eyewash caused the plaintiff to lose her eyesight She sued the drug company The trial court sustained the demurrer interposed by the drug company The plaintiff then appealed to the Court of Appeals, and the judgment of the trial court was reversed

JAPAN PHARMACISTS UNION WANTS BETTER CONTROL OF NARCOTIC SALES

As a result of the action of the Japan Pharmacists Union, a recommendation was addressed to Baron Tatsuo Yamamoto signed by President Kametaro Kawai of the Union There seems to be an increasing tendency to the use of narcotics and while there have been more violations by pharmacists it has been largely due to the fact that those who seek to secure narcotics intimidate the pharmacists and not because the pharmacists desire to sell narcotics

In the petition sent to the government it is suggested that sanatoriums be established, that drug addicts be registered, that local limitations be placed on the use and quantities of prescribed narcotics and that uniform narcotic prescriptions be established, also that there be better control of handling narcotics by unqualified persons

PROPOSED REVISION OF THE REGULATION OF DANGEROUS DRUGS IN JAPAN

The basic aim of the proposed revision of the narcotic regulations is to prevent the abusive use of narcotics and the following measures have been advanced

1 To expand the definition of narcotics
2 To replace the existing system of registration by a permit system
3 To require physicians to report narcotic addicts they have treated and to place stricter control on their issuance of prescriptions and to inflict severer punishment on violators of regulations

The following are the principal items of the proposed revision

Article 1 Narcotics in these regulations include the following

1 Morphine, diacetylmorphine and other morphine esters and salts
2 Crude morphine, coca leaves and crude cocaine
3 Ecugonine, cocaine and other ecugonine esters and salts
4 Dihydro oxycodeinon dihydro codeine, in dihydro morphinon acetyl dihydro codeine, dihydromorphine and other esters and salts
5 Codeine ethyl morphine, benzyl morphine and other morphine esters and salts
6 5-nitro morphine and its derivatives
7 Dihydro codeine and tebine and their salts
8 Diacetyl-morphine and those containing 20 per cent or more of morphine and ester (excepting diacetyl morphine codeine ethylmorphine)
9 Those containing 0 2 or more per cent of the following dihydro oxycodeinon, dihydro-codeinon dihydromorphinon acetyldihydro-codeinon, dihydro morphine or their esters 5 nitro morphine and derivatives
10 Those containing ecugonine or cocaine and their ecugonine esters, their amount being 0 1 or more per cent
11 Indian hemp or those containing its resin

THE LABORATORY

O U Sisson, Chicago, who was the Pharmacy Week prize winner last year, has donated the picture of "The Laboratory" which was used as the background of his Window It is about 5 feet high and 7 feet wide a Hollywood production by Pathé The ASSOCIATION thanks Mr Sisson for his donation which has been placed in the Museum of the American Institute of Pharmacy

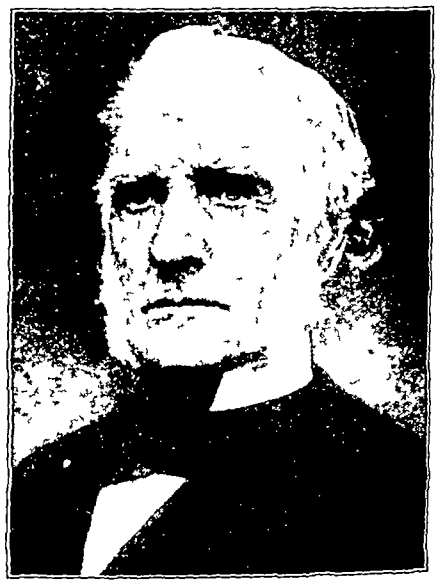
BOOK NOTICES AND REVIEWS

'Aan P van der Wielen" D B CENTEN'S Uitgeversmaatschappij N V Amsterdam 1934 205 pages The students and friends of European teachers have a happy custom of issuing a 'festschrift" when a teacher has completed a certain number of years of service This particular brochure is dedicated to Professor P van der Wielen upon the completion of his twenty-fifth year as professor of pharmacy at the University of Amsterdam Twenty of Professor van der Wielen's former students have each contributed a piece of original research in his honor These monographs are bound together with a tribute to Professor van der Wielen and a summary of his publications numbering eight books, twelve pamphlets and several hundred contributions to journals The space allowed the reviewer barely warrants more than the mention of the titles of the twenty monographs They are as follows (1) *The Bacteriological Nature of Bread* (W C de Graaf), (2) A Review of the Standards for Alcohol (D van Os), (3) A New Oxidation and Synthesis in the Dog-Kidney (I Snapper and A Grunbaum), (the isolated dog-kidney has been found to oxidize phenyl propionic acid to cinnamic acid which separates in combination with glycocol as cinnamoyl glycocol), (4) Pharmaceutical Investigation of Digitalis Leaves by the Aid of Biological Methods (U G Bijlsma) (5) The Forming of Exotoxins by Staphylococcus (E W Walch), (6) New Applications of Old Truths in Documentary Research (C J van L Hulsebosch), (7) Contribution to the Investigation of Fruit Lemonade Syrup (C Bakker), (8) The Merchandise Marks Act and the Price of Medicines (K Holm), (9) The Investigation of Various Kinds of Balsam Copaiba (J W Birza) (10) The Blood-Sucker as a Toxicological Test Animal (J T Groll), (11) The Determination of Hexamethylenetetramine in Anhydromethylene Citric Acid Hexamethylene-tetramine (Helmitol-Bayer) (M J Schulte), (12) The Quantitative Colorimetric Determination of Meconic Acid in Opium by Means of the Stufen Photometer (C G van Arkel), (13) The International Method for the Determination of Morphine in Opium (E C M J Hollman), (14) Rhizome and Extract of Aspidium (J Kok), (15) East-Indian Poisons (C J Blok), (16) The Behavior of Various Acids in Relation to Cinchona Tannins (E W Ansingh), (17) A Colorimetric Determination for Cysteine (E Hazeloop), (18) Exterior Influences upon the Crystallization of NaCl (H D van Oort), (19) Influence of Glucose upon the Rotation of Blood Serum of Patients in Health, with Hyperglycæmia and Others (G Sant), (20) Standardized Sieves (P Spaander)—ELMER H WIRTH

We are in receipt of reprints 'Report on Preservatives," *Journal of the Association of Official Agricultural Chemists*, John C Krantz, Jr "Utilization of Inulin from Arctium Lappa and Certain Soluble Inulins by the Rat," by C Jelleff Carr and John C Krantz Jr, *Department of Pharmacology, School of Medicine, University of Maryland*

AMERICAN HOSPITAL ASSOCIATION

The American Hospital Association Conference will be held in Philadelphia, September 24th–28th The Hospitals Libraries' Round Table will be held on Tuesday, September 25th, with Mr Robert E Neff, Administrator, University Hospitals, State University of Iowa, Iowa City, Iowa, acting as Chairman



PHILO CARPENTER

(See page 922, JOURNAL A PH A, 1931)

In the Pharmacy Exhibit, Century of Progress, is a reproduction of the first Chicago Pharmacy, owned by Philo Carpenter, opened in 1832 A collection of materials and utensils of the period are shown

THE 1935 A PH A CONVENTION

The state of Oregon and the Pacific northwest boast quite justly of scenic wonders Within view of Portland, the 1935 convention city of the AMERICAN PHARMACEUTICAL ASSOCIATION, towers perpetually snow-capped Mount Hood like a sentinel To the north in Washington are Mt St Helens, Mt Rainier and Mt Baker To the south loom Mt Jefferson, the three peaks of the Sisters and Mt McLoughlin The Columbia river cuts its way seaward through the gorge with the precipitous bluffs of Oregon on the south and Washington on the north The Columbia river highway with its tortuous curves and famous waterfalls is a feat of engineering skill which is well worth the short trip from Portland In more distant parts of the state are other natural wonders Crater Lake, the Oregon caves, the famed Rogue river, the fossil beds in Central Oregon and the lava beds of the McKenzie Pass To the west is the rugged coast line with its numerous beaches These are just a few of the scenic marvels which abound within the state

The convention-bound pharmacists, however, will have opportunity to see not only the majestic beauty of the state, but, because of their natural interest and training, will appreciate the varied flora and the tremendous possibilities as a prospective drug plant haven

Nature has endowed Oregon with varied climates Geographically, the state is divided by the Cascade range into two divisions, commonly known as Eastern and Western Oregon Climatologically, it is divided into six sections Coast Region, Southern Oregon, Willamette Valley, Columbia Basin, Blue Mountain Division and Central Oregon

Editor s Note The foregoing is from a paper by Prof E T Stuhr, which we have been permitted to read, through the courtesy of F C Felter of the *Pacific Drug Review*

The same writer presented a paper on Medicinal Trees of the United States" before the Scientific Section, A PH A in 1929, and another, in 1931, on "Oregon Drug Plants," these two monographs have been separately printed by the author In the preface of the former monograph it is stated that 'of the 1177 different trees that make up our forests, as listed by George B Sudworth, in his "Check List of the Forest Trees of the United States," 137 are of special interest because of their medicinal virtues from products they supply The purpose of the other monograph is to present an authentic source of information to those possibly interested in Oregon plant life

Reference is here made for the members of the Plant Science Seminar and others who will embrace the opportunity of studying the plant life of this section of the United States during the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION

GEORGE A GORGAS

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII OCTOBER, 1934 No 10

GEORGE A GORGAS

This is the fiftieth anniversary of membership in the AMERICAN PHARMACEUTICAL ASSOCIATION of George Albert Gorgas Mr Gorgas was born in Cumberland County, Pennsylvania, November 1858, he received his early education in the public schools and the Cumberland Valley State Normal at Shippensburg, Pa , and thereafter served an apprenticeship in the pharmacy of Daniel H Hamaker in Harrisburg In 1879 he matriculated at the Philadelphia College of Pharmacy and graduated in 1881

In 1883 Mr Gorgas engaged in business on his own account, purchasing the pharmacy of I D Lutz on Market Square, Harrisburg, here he conducted the establishment until 1893, when he moved to the present location, later he opened two branch stores, one of which was discontinued last year

The subject of this brief sketch has always shown interest in improving pharmaceutical practice for service of the public, he has been active in organization work and an outstanding member of the Pennsylvania Pharmaceutical Association, of which he was president in 1906, one of his presidential recommendations established Life Membership, in 1918 he was elected a Life Member and, this year, in recognition of his many services to pharmacy and years of loyal membership, he was elected an honorary member of that organization, he is also a member of the National Association of Retail Druggists

In 1932 the Philadelphia College of Pharmacy and Science conferred on him the degree of Master of Pharmacy, he is a member of the Board of Trustees of that institution, and its "Model Pharmacy" was made possible through the efforts of Mr Gorgas

Our fellow-member is active in civic affairs, Kiwanis Club and Masonic bodies

EDITORIAL

E G EBERLE EDITOR 2215 Constitution Ave , WASHINGTON, D C

THE PHARMACY EXHIBIT—A CENTURY OF PROGRESS INTERNATIONAL EXPOSITION

PHARMACY Week brings the message of pharmacy to the public each year, the Pharmacy Exhibit, in Chicago, brought its service to the attention of millions of visitors and the American Institute of Pharmacy, as the permanent home wherein the activities of pharmacy will be of record, acquaints the Government and the people that pharmacy has a most important part in standardizing materia medica and preparations in which these products are properly represented

The Pharmacy Exhibit will be closed at the end of this month but it will be made permanent so that the purpose so successfully established will be continued

In conformity with the general plan of A Century of Progress the Pharmacy Exhibit was arranged to appeal to the layman and under the direction of Chairman H C Christensen and the committee having the arrangements in charge the exhibit successfully met the test, attracted the interest of the visitors and received general favorable comment from them The success was made possible through the cooperation of all divisions of pharmacy and the publicity given by pharmaceutical publications In a dramatic manner visitors were told of the development of pharmacy and the use of drugs and the methods of standardization, so that they received a better understanding of the progress made educationally and otherwise in pharmaceutical service The efforts of those in charge were supplemented by the schools of pharmacy, boards of pharmacy, revision committees of the U S Pharmacopœia, National Formulary and Syllabus, organizations, and the manufacturing industries—to all of them much credit is due

The Exhibit portrayed the history of pharmacy, development of education and legislation—the purpose being to acquaint the visitors with the history of pharmacy, the progress made by contrasting old methods with new, showing the advances in educational and legal requirements, resulting in improved pharmaceutical service and protection of the public

A comment on the activities of those in charge of the exhibit was made in the February JOURNAL and reference is made here to render credit for the accomplishment which marks a most important effort in the history of American pharmacy In summing up, it may be repeated that the entire panorama of the exhibit informed the public of the great improvement in pharmaceutical service during the past century, from the crude products and utensils of the past to the uniform, standardized products of to-day with precision instruments and equipment, from the unsupervised practice of the past to the restricted and supervised practice of to day, thus guarding the public health and welfare, from the pharmacist of yesterday to the one of to-day, equipped for research as well as practice

The exhibit has been of benefit in bringing pharmacy's message to the general public and has had a distinct educational value for the professional man as is evidenced by the many registrations A very favorable impression has been given to the medical and dental professions and pharmacy has risen in prestige The pharmacist who has seen the exhibit has learned something more about his

profession and has come away with greater respect for it These are not idle theories, they are the judgments expressed by the many visitors in conversations with attendants Pharmacy has responded to an opportunity and profited thereby—the Pharmacy Exhibit and A Century of Progress have been eminently successful

---

DECENNIAL OF PHARMACY WEEK

THE thought which prompted and resulted in the annual celebration of Pharmacy Week was presented in the address of Robert J Ruth, as chairman of the Section on Practical Pharmacy, A PH A, at the Buffalo meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION

The underlying motive of a National Pharmacy Week is the education of the public relative to the mission and service of pharmacy, and any other purpose that will detract and confuse does not represent the idea which was uppermost in the mind of the founder of this annual occasion

The earlier celebrations were directed by Robert J Ruth and since by Anton J Hogstad, Jr The educational efforts of the latter and of E L Newcomb have brought pharmacy to the attention of schools and libraries by the series of maps—drug map of the World, chemical map of North America, map of pharmacy institutions and those engaged in educating and training pharmacists The publications have whole-heartedly given support and directed the thoughts of pharmacists relative to ways that will bring the message of pharmacy to the public All of the publications have contributed to the better understanding of pharmacy by the public, some have served in a larger way and these, no doubt, have been rewarded accordingly by the appreciation of those whose aim is to advance the profession

The associations—local, state and national—have aided in the cause according to their opportunities and thereby their organizations and their members have gained by recognition of the professional standing that pharmacy enjoys It remains for them to exhibit a greater interest, year by year, in order to make Pharmacy Week what it should be and to bring the message of pharmacy to the public in daily efforts through publicity of a high order, associating the service to a greater extent with matters that concern public health

In an earlier editorial it was said, in substance, that science had added years to the span of human life and improved hygienic conditions—pharmacy as a profession, as a science and in its business relations contacts with the public and thereby Pharmacy Week summarizes the daily efforts of pharmacists In years gone by drug stores were factors in the dissemination of news and formulating of plans far-reaching in their influence, to day pharmacists have great opportunities for dissemination of public health information What is needed is more publicity for pharmacy, more druggists who will actively express loyalty to pharmacy by doing their part and not letting others do it for them, those who have had an active part in Pharmacy Week have shown their loyalty by publicity which extends beyond the activities of the seven days so designated

Canon H J Cody, formerly Minister of Education for Ontario, in addressing the recent convention of the Ontario Retail Druggists' Association said to the members

"You are all, I am quite sure, prepared to regard yourselves primarily as ethical and scientific pharmacists Perhaps the term 'Druggist' has in some quarters become usual, but to my mind, the term 'Pharmacist' is undoubtedly a term most suitable for application to the ethical and scientific side of your calling Your work does require a broad foundation, not only of general knowledge, but of specific training It is not fair, in these days, for anybody to serve the public unless his outlook is unduly wide, and his knowledge of the basic principles of his calling correctly based "

Referring to Pharmacy Week in his presidential address President R L Swain said "Pharmaceutical legislation, pharmaceutical education, the whole of pharmaceutical service rests upon the professional character of pharmacy Pharmacists should be keen to recognize this, and diligent in their efforts to impress it upon the public mind I cannot be too emphatic in urging pharmacists to embrace every opportunity to advance and elevate their professional work as a basic and fundamental thing The principles underlying it are sound, and the whole idea is a dignified and worth-while approach to a most important subject "

FORTY-EIGHT LABORATORIES

BY ROBERT P FISCHELIS *

WHILE researches in chemistry, pharmacology and other medical and pharmaceutical sciences are being carried on with satisfactory progress in the laboratories of our colleges, research foundations and industrial establishments, other forms of research which profoundly affect the welfare of pharmacy and pharmacists are being neglected to some extent because of a lack of coordinated effort In the forty-eight states of our Union, forty-eight legislatures are passing statutes intended to regulate various activities for the welfare of the people as a whole Forty-eight Governors are issuing executive orders and directions for carrying out "the will of the people" as expressed in the legislative enactments of their representatives Forty-eight State health departments are enforcing forty-eight State health laws with varying provisions which include regulation of the manufacture and distribution of foods and drugs Forty-eight boards of pharmacy are enforcing forty-eight different pharmacy laws according to the powers conferred upon them to protect the public against incompetent prescription compounding and careless dispensing of drugs, medicines and poisons

Undoubtedly, greater uniformity in these legislative and administrative activities is a desirable end Yet there is also an advantage in lack of uniformity Under our system of government the forty-eight states are really forty eight laboratories in which a great variety of experiments can be carried on with much profit and advantage to the people as a whole As a matter of fact, State food and drug laws, and laws for the regulation of traffic in narcotic, hypnotic and other

* President AMERICAN PHARMACEUTICAL ASSOCIATION

deleterious or poisonous drugs have preceded and paved the way for federal regulation along similar lines The State laws have shown the weakness of some methods of regulation and the strength of others It is not uncommon for one State or group of States to establish procedures which may be considered radical or extreme in one decade only to become the minimum standards throughout the Country in the next

But to what extent is Pharmacy profiting by the researches and experimental developments in our forty-eight laboratories? Do the pharmacists of New York have any conception of what is going on in the profession in Oregon or do the members of the profession in Maine have available the results of regulatory experiments in the distribution of drugs and medicines or the public control of health matters in California? The answer is to be found in the multiplicity of outmoded and often unworkable proposals for regulation of various phases of the practice of pharmacy which crop out annually in every State when officers and committees are assigned to accomplish a progressive revision of unsatisfactory existing conditions

There appears to be no central agency to which pharmacists in the forty-eight states can turn to-day for summarized information as to what has been tried and found wanting or what has been tried and found effective This does not mean that the information cannot be had, for it certainly exists However, it is locked within the borders of individual states and frequently it can be had only through personal contact with individuals because no one has taken the trouble to record what months and even years of patient effort may have brought about

The Conference of Pharmaceutical Law Enforcement Officials is the brightest spot that has appeared on the horizon for some time as far as the coordination of legislative and law enforcement information is concerned The Conference of Pharmaceutical Association Secretaries is moving in the direction of providing a valuable interchange of information on State Association activities Both groups have been stimulated and encouraged by the AMERICAN PHARMACEUTICAL ASSOCIATION

However, these agencies as well as the National and State organizations representing the various subdivisions of Pharmacy, require the services of a clearing house where the results of surveys of local, State and National conditions may be recorded, digested and disseminated, where the results of pioneering researches in problems of social as well as technical and industrial significance to the profession may be collated and evaluated and from which sound bases for the development of pharmaceutical education and licensure and the control of the manufacture and distribution of drugs and medicines may emanate A coordination of the experimental work of our forty-eight laboratories so as to avoid waste and duplication of effort will advance the cause of pharmacy tremendously The coordinating agency or master laboratory should be set up in the Institute of Pharmacy of the AMERICAN PHARMACEUTICAL ASSOCIATION Here is a specific project of benefit to pharmacy as well as to the people of our country for which funds must and should be advanced promptly The National and State pharmaceutical associations could find no better common meeting ground on which to start cooperative work and give evidence of the sincerity of their expressed desire to advance the welfare of the profession

SCIENTIFIC SECTION

THE GUINEA PIG AS A HEMATOPOIETIC TEST ANIMAL *

(A PRELIMINARY REPORT)

BY J W LANDSBERG AND MARVIN R THOMPSON

Since the introduction of liver extract into clinical medicine, there has been the need of a dependable laboratory assay method to determine the potency of this therapeutic agent There have been various methods of assay introduced (1, 2, 3) but the practicability and the specificity of these methods may be questioned In two of the described methods, McGowan (1) and Vaughan, *et al* (3), used the domestic fowl and the pigeon, respectively In the other method, McGowan and Sinclair (2) used the domestic pig (*Sus scrofa*)

In a consideration of the first two methods, there are several factors worthy of mention The erythrocytes of both the domestic fowl and the pigeon belong to the nucleated series This fact detracts from the practicability of the methods due to the difficulty encountered in the enumeration of the reticulocytes This difficulty was evidently experienced by Edmunds, *et al* (4), as they state, in comparing their work to that of Vaughan (3), "This discrepancy may possibly be explained by the method of counting and classification" (page 92, par 3)

The presence of a nucleus in the erythrocyte causes some difficulty in determining which cell is a reticulocyte and which is not, leaving the final decision to the judgment of the worker This factor introduces a personal variation which may have considerable bearing upon the final result When a non-nucleated blood sample is used this difficulty cannot arise If the cell in question has a small or large amount of reticular material it is a reticulocyte and must be enumerated as such The worker is not confused by the dual presence of a nucleus and a reticulum and is therefore able to differentiate, without personal influence, those cells which are reticulocytes and those which are not

Another factor present in the published methods is that of housing the test animal The average animal room does not readily lend itself to colonies of pigeons and domestic fowls The confined area of the cages plus a reduced amount of sunshine and exercise must effect the general well-being of the animal These conditions are rather far removed from the natural habitat of such animals Peabody and Neale (5) make the following statement concerning this problem " it was noticed that long confinement on the rather restricted diet apparently produced subnormal blood conditions" (page 1231, par 2)

This difficulty also presents itself in the work of McGowan and Sinclair (2) who used the domestic pig (*Sus scrofa*) of about four months of age weighing about

* From the department of Pharmacology, School of Pharmacy, University of Maryland
Abstracted from a report presented before Scientific Section at the Annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION May 7 1934, Washington, D C

43 5 pounds The difficulties of maintaining an animal colony of such test objects are easily discernible without further elaboration

Previously suggested methods, in some cases, involve the use of an experimental animal with abnormal blood conditions Some investigators (1, 2, and 5) have used experimental animals suffering with various degrees of anemia Such circumstances we feel must certainly create a marked variation in the response of the test animal to the therapeutic agent As these anemias are present because of pathological conditions and are not produced by controlled artificial methods, the degree of anemia will vary from time to time in the same animal and will certainly differ in a group of animals The degree of anemia present, accompanied by the changes in the hematopoietic organs, and the efforts of the hematopoietic system to regenerate red blood cells must certainly influence the response produced by liver extract It is certainly possible and not highly improbable that the same dosage of liver extract would produce a greater reticulocyte response in a hematopoietic system in need of such a stimulant than in a normal one which did not, provided of course, that the blood-producing organs were not partially or completely exhausted

The present study was undertaken to find a normal, healthy experimental animal meeting the following requirements (1) having non-nucleated erythrocytes, and (2) thriving under the usual animal room environment We selected the guinea pig because it satisfied these two requirements and also because of the facility with which we could obtain the blood smears from the marginal veins of the ears of this animal It was our purpose to determine whether or not a normal, healthy guinea pig would give a reticulocyte response to liver extract and still remain essentially normal

These studies represent a preliminary endeavor to determine the practicability of using the guinea pig as a hematopoietic test animal and they should be followed by a more elaborate and comprehensive study

METHODS

General —The guinea pigs were selected without reference to particular breed Normal, healthy, adult pigs of male sex were chosen The weight range was between 500 and 800 Gm The diet upon which these pigs had been maintained and which had proved adequate, was not modified during the experiment Before an animal was used for experimental purposes an erythrocyte count and a blood smear were made to determine whether or not the blood of the animal was normal Reticulocyte counts were determined on each animal to be studied to establish a normal base line The animals were weighed before injection, several times during the injection period, and after the injection period Erythrocyte counts were made before, during and after the period of injection The incisions on the marginal veins were very small so as not to cause excessive bleeding which might result in a hemorrhagic anemia During the routine procedure the animal lost only two small drops of blood per day, in some few instances perhaps four or five drops, but at no time was the blood loss sufficient to cause an anemia, as will be demonstrated in the discussion The first drop of blood obtained was discarded and the second drop used for the reticulocyte enumeration The subcutaneous injections were given over a period of eight consecutive days The smears, made every day at approximately the same hour, were immediately followed by the injections

Hematological Methods —The ear was incised on the marginal vein and a small drop of blood was placed on a chemically clean cover slip With a sharpened toothpick a drop of alcoholic brilliant cresyl blue was added to the blood on the cover slip The blood and stain were mixed intimately with the toothpick, the second chemically clean cover slip was placed over the first

and the blood allowed to spread The smear was then pulled, the two cover slips were allowed to dry in the air and counterstained with Wright's stain

In the enumeration of the reticulocytes five hundred red cells were counted in consecutive fields The portions of the slides selected were thin and evenly spread in order that the red cells would not overlap The reticulocyte count was made with oil immersion and the field reduced so that not over twenty-five red cells were counted per field If the smear was at all difficult to count, one thousand red cells were examined The reticulocyte counts were made by one person through out the experiments Some of the smears (containing the higher percentages of reticulocytes) were sent to a technician, trained by one of the authors for a reticulocyte count The technician did not know the reticulocyte count and, in fact, was not aware of the investigations being carried on by us In all instances our reticulocyte count did not vary over one per cent from that of the technician

The red corpuscles were counted in a new Newbauer Counting Chamber using the Thomas red cell pipette Both of these instruments were certified by the Bureau of Standards The average of two red counts, the difference between the two being not over one hundred thousand, was taken as the red cell determination

Dosage —The experimental animals were injected with 1 cc (per day) of No 343 Lilly Liver Extract[1] at approximately the same hour each day As the liver preparations were injected subcutaneously in the abdominal region, great care was exercised not to penetrate the abdominal wall and expel the fluid into the visceral cavity With one exception, all the animals received the same dosage of liver extract over the same period of time (eight days) (This animal received ex tract for one day longer than the other animals and 2 cc of extract for the last two days) One cc of the extract was stated to be equivalent to five Gm of liver Each animal therefore, received a total equivalent of 40 Gm of fresh liver We have reason to believe that smaller doses will pro duce satisfactory responses

RESULTS AND DISCUSSION

Control Periods —As a control measure, each animal was observed for a period of about seven days before it was injected with liver extract During this time the reticulocytes and the erythrocytes were counted and the animal weighed The normal averages for reticulocytes ranged from 0 63 per cent to 3 54 per cent (Table I)

Effect of Iron on Reticulocyte Response —It was essential to ascertain if the method used was producing a post-hemorrhagic anemia through blood loss If the method was producing an anemia, there should be a definite response to iron and ammonium citrate which is used clinically for post-hemorrhagic anemia On the other hand, if no anemia was produced by the puncture of the marginal veins, but a reticulocyte response occurred as the result of iron present in the extract, this also could be demonstrated

For this experiment two pigs were used and subjected to the same method of procedure Normal findings were recorded for five days and the average of these used as a base line A solution of iron and ammonium citrate (U S P) was made with distilled water of such strength that one cubic centimeter of the solution contained 2 5 mg of iron and ammonium citrate The solution was given as described under "DOSAGE " The experimental animals were injected every day for eight days The reticulocyte counts were made during this period and for nine days following the injection interval to provide for a delayed response Neither the reticulocyte count, the erythrocyte count nor the weight was influenced by the iron and ammonium citrate

[1] We are indebted to Dr H W Rhodehamel of the Eli Lilly Company, for generously supplying us with the liver extract preparations

Following this procedure the pigs were left in their cages, under the same conditions as those preceding the experiment, for a period of one month At the end of this interval the reticulocytes were counted on four successive days to obtain a normal range, and the injections of liver extract were begun The injections were carried on for eight days The liver extract produced a definite reticulocyte response (Table I, animals number 1 and number 2), but did not effect the erythrocyte count nor the weight

As there was no response to the injection of iron and ammonium citrate, one may draw two conclusions (1) that no anemia was produced by the hematological methods, (2) that the experimental animals were not suffering from a nutritional anemia The hematopoietic system, in cases of post-hemorrhagic anemia, attempts to compensate for the blood loss without therapeutic stimulus which alone would have produced some reticulocyte response As iron preparations are clinically recognized in the treatment of post-hemorrhagic anemias a response should have occurred if this condition were present Schultze and Elvehjem (6) have demonstrated that iron (in the presence of copper) brought about a definite reticulocyte increase in conditions of nutritional anemia Our experimental animals were obtaining sufficient copper from the diet to utilize any iron present, therefore a reticulocyte rise should have occurred if this anemia were present

TABLE I

Experimental Animal No	Reticulocytes			Day of Maximum Increase
	Normal Average	Increase	Percentage Increase	
1	1 05%	3 95%	376 ± 95	8
2	0 95%	3 85%	405 ± 105	9
3	1 70%	5 10%	300 ± 58	10
4	1 30%	4 10%	315 ± 76	11
3 (Reinjection)	0 63%	3 77%	598 ± 158	7
4 (Reinjection)	1 23%	4 17%	339 ± 81	10
5	3 30%	1 70%	51 ± 33	9
6	3 70%	4 50%	121 ± 27	5

Effect of Liver Extract on Reticulocyte Response—The injection of liver extract produced a reticulocyte response in all the experimental animals tested (Table I) without an increase in the erythrocytes or the weight After the peak of the response had been reached the number of reticulocytes gradually returned to normal The question immediately arose as to whether the hematopoietic organs had been exhausted by such stimulation or whether they would again respond to liver extract After a period of one month two experimental animals, previously used, were again injected, the same technique being used There was a definite response to the liver extract (Table I, reinjection)

These studies are particularly interesting in that they point to the possibility of a standardized laboratory animal If such is the case, one could not only determine the potency of a preparation, but also could compare directly the action of various preparations upon the same animal

Effect of Heat on Liver Extract—The liver preparations injected produced a significant rise in the reticulocyte count With this fact in mind, we were desirous of determining what influence a modified sample of the preparation would produce

The sample was prepared as follows 16 cc of the extract were rapidly boiled to dryness without scorching To the residue was added enough distilled water to bring the volume to 16 cc , this sample was again boiled to dryness and the residue dissolved in enough distilled water to make the volume 16 cc

After the normal base line was obtained the same procedure of injection was carried out as in the previous experiments The response produced by the injection of the heated sample was definite, but less than that created by the unmodified sample (Table I, animals number 5 and number 6) The heating did not destroy the activity, but may have reduced the potency somewhat Additional study may clarify this point

In Table I the reticulocyte responses following the injection of liver extract are given The erythrocyte counts did not change significantly, and are therefore omitted to conserve space

From the data thus far obtained, we feel that the method described compares favorably with the other methods presented in the literature and is, therefore, worthy of further study, particularly with reference to its specificity

In a personal communication from Dr H W Rhodehamel, of Eli Lilly and Co , we have learned that the samples of liver extract used had shown clinical activity

CONCLUSIONS

1 A method suggesting the possibility of using the normal, healthy guinea pig as a hematopoietic test animal is introduced

2 Experimental test animals that did not respond to injections of iron and ammonium citrate later gave a reticulocyte response when injected with liver extract

3 The injection of liver extract over a given period caused a definite rise in the reticulocyte count without significantly effecting the erythrocyte count or the weight

4 A second period of injection produced a response in the reticulocyte count similar to that produced in the first period suggesting the possibility that a given animal may be repeatedly used for test purposes

5 The active constituent of liver extract which produced a reticulocyte response in the guinea pig is not readily destroyed by heating

6 This report is of a preliminary nature and is presented merely as a possibility worthy of further study

BIBLIOGRAPHY

(1) J P McGowan, *Edinburgh Med J* , 37 (1930), 330
(2) J P McGowan and R D Sinclair, *Ibid* , 38 (1931), 405
(3) Vaughan, Muller and Zetzel, *Brit J Exptl Path* , 11 (1930) 456
(4) C W Edmunds, H H Brueckner and A I Fritzell, Jour A Ph A , 22 (1933) 91
(5) W A Peabody and R C Neale *Ibid* , 22 (1933), 1232
(6) M O Schultze and C A Elvehjem, *J Biol Chem* , 102 (1933), 357

ALKALOIDAL REAGENTS V THE ACONITE ALKALOIDS *

BY JAMES C MUNCH AND HARRY J PRATT

The reactions of the aconitine group of alkaloids with the usual alkaloidal reagents, as well as with certain special reagents reported in the literature, contain

* Scientific Section, A Ph A , Madison meeting, 1933

conflicting statements regarding colors and precipitate formations (1–30) Data on aconitine, pseudoaconitine and benzoylaconine are given in Table I

TABLE I —REACTION OF ACONITE ALKALOIDS WITH ALKALOIDAL REAGENTS

(Reported in the Literature)

No	Reagents Name	Composition	Aconitine Color or Ppt	Threshold Mg /Liter	Pseudoaconitine
1		HCl conc	Colorless		
2		HNO_3 conc	Colorless heated brick red		
3	Vitali	HNO_3 + KOH alc	Colorless odor EtOBz		Purple-red
4	Alvarez	Br + HNO_3 + NaOH alc then 10% aq $CuSO_4$	Red or brown deep green		
5		H_2SO_4 conc	Colorless		Colorless
6	Erdmann	$H SO_4$ + HNO_3	Colorless changing to violet		
7		H_2SO_4 + $K_2Cr_2O_7$	Yellow to light green		
8	Mandelin	H_2SO_4 + NH_4 meta vanadate	Light brown to orange		
9	Froehde	H_2SO_4 + Na molybdate	Yellow–yellowish–brown–blue		
10	Mecke	H_2SO_4 + SeO_2	Yellowish lt brown on heating		
11	Marquis	H_2SO_4 + HCHO	Colorless		
12	Montt	H_2SO_4 + resorcinol	Yellow red to red violet		
13	Schneider	H_2SO_4 + sucrose	Red		
14		Phosphoric acid conc	Red violet on heating		Colorless
15		Phosphomolybdic acid	White turning blue (A)	200	
16	Palet	H_3PO_4 + Na molybdate	Violet		
17	DeVry s Sonnen schein	NH_4 phosphomolybdate	Yellowish white ppt (A)		
18	Scheibler	Phosphotungstic acid	White ppt (A)	200	
19		Phosphoantimonic acid	White ppt (A)	1000	
20	Ecolle	Silicotungstic acid	White ppt (A)		
21	Wormley	Br + KBr		2	
22		KBr		10	
23		HIO_3	Colorless		
24	Wagner	IKI[a]	Red brown crystals	2	Precipitate
25	Jurgens	KI + CH_3COOH	Tabular *rhomboids*	50	Needle druses
26	Dragendorff	BiI_3 4KI	Yellow (A)		
27	Marme	CdI_2 2KI	Orange red (A)	100	
28	Mayer	HgI_2 2KI	Yellowish white (A)	100	Ppt dilute *soln*
29		$NaClO_4$		2	
30		$K_2Cr_2O_7$	Yellow ppt	2	
31	Dunstan and Carr	$KMnO_4$	Dense purple-red crystals	250	
32		Na or NH_4CNS	(A)	10	
33		K_3FeCN_6	Ppt conc soln		
34	Cole	K_4FeCN_6	Ppt conc. soln (A)		
35	Mellaneh	K_4FeCN_6 + HCOOH	Green		Green
36		Na nitroprusside	(A)		
37	Fehling Solution	Alkaline copper compd	Granular white ppt		
38		$AuCl_3$[a]	Whitish yellow (A)	200	Ppt dilute soln
39		$PtCl_4$	Ppt conc	500	Ppt conc. soln
40		$FeCl_3$	Yellow (A)		
41		$HgCl_2$	Ppt conc (A)		
42	Millon	$HgNO_3$	White (A)		
43		$AgNO_3$	(A)	10	
44		$ZnCl_2$	(A)		
45		$PdCl_2$	(A)		
46		CH_3COOH	Red crystals		
47		Gallic acid	Colorless		
48	Hager	Picric acid	Yellow concn soln (A)	250	
49	Knorr	Picrolonic acid	(A)		
50	Rosenthaler	Rufiamic acid	(A)	5000	
51		Tannic acid		300	Ppt. dilute soln
52		$NaHCO_3$	Characteristic rosettes	10000	
53		KOH	(A)	5000	
54		KCN	(A)	5000	

[a] Benzoylaconine gives a yellow ppt with $AuCl_3$ (38) and granular crystals with IKI (24)
A = Amorphous ppt

The series of standard alkaloidal reagents used in our previous investigations (13, 19, 20, 21) were supplemented by a number of special reagents, a total of 71 being considered Our results are given in Table II Deviating somewhat from our previous practice, one drop of solution was placed on a watch crystal and mixed

TABLE II —REACTIONS OF ACONITE ALKALOIDS WITH ALKALOIDAL REAGENTS

No	Reagent	Aconitine	Benzoylaconine	Aconine
1	HCl	0	0	0
2	HNO_3	0	0	0
5	H_2SO_4	0	0	0
6	$H SO_4 + HNO_3$	0	0	0
7	$H_2SO_4 + K_2Cr_2O_7$	0	0	0
8	$H_2SO_4 + NH_4$ meta vanadate	Yellow soln large specks	Yellow soln large specks	Yellow soln large specks
9	Froehde	Cold 0 heated 0	Cold 0 heated blue gray	Cold 0 heated blue-gray
10	Mecke	0	0	0
11	Marquis	0	0	0
12	H_2SO_4 + resorcinol	Cold 0 heated lt brown granules (A)	Cold 0 heated orange granules (A)	Cold 0 heated red violet bundles of tabloids (C) ?
13	Schneider	Cold 0 heated black	Cold 0 heated black	Cold 0 heated black
55	$H SO_4$ + saccharose	Cold 0 heated brown	Cold 0 heated black	Cold 0 heated black
14	H_3PO_4	Red violet	Black	Dark violet
16	Palet	Dark purple changing to black	Red purple changing to dark brown	Purple violet changing to green then dark green
18	Schiebler	Dense white (A)	Whitish yellow (A)	White (A)
20	Ecolle	Fluffy white (A)	Clabber white (A)	Curdy white (A)
56	HNO_3 + Br	0	0	0
23	$H SO_4 + KIO_3$	0	0	0
24	Wagner	Curdy light brown (A)	Staining no ppt	Dark brown (A)
26	Dragendorff	Dense white flocc (A) later dark	Amorphous white ppt and tables	Cloudy white (A)
28	Mayer	Dense white flocc (A)	Sparse white warts (A)	Sparse white warts (A)
57	$KClO_3$	0	0	0
30	$K_2Cr_2O_7$	Yellow (A)	Yellow (A)	Yellow (A)
31	$KMnO_4$	Purple (A)	Purple (C)	Purple (C)
33	K_4FeCN_6	Green white (A)	Green white (A)	Green white (A)
34	K_3FeCN_6	White granular (A)	Whitish yellow (A)	White granules (A)
35	Mellaneh	Greenish blue granules (A)	Greenish blue granules (A)	Greenish blue granules (A)
36	Na nitroprusside	White rods (A)	White (A)	White (A)
37	Fehling s soln	White granules (C)	Sparse tablets (A)	Sparse tablets bundles (C)
39	$PtCl_4$	Yellow white plates (A)	Yellow white plates (A)	Yellow white plates (A)
40	$FeCl_3$	Yellow (A)	Sparse yellow (A)	Sparse yellow (A)
41	$HgCl_2$	Black (A)	Specks (A)	Gray (A)
42	Millon	White (A)	Soln later white needles	White warts (A)
45	$PdCl_2$	Specks (A)	Lardy mass white (A)	Specks (A)
46	CH_3COOH	0	0	0
48	Picric acid	Dense yellow (A)	0	0
54	KCN	White (A)	Large tables (C)	Tables prisms (C)
58	Dimethylglyoxime	Amorphous later rods	Amorphous	Feathery sheaves
59	HCl + vanillin + Br	0	0	0
60	$HNO_3 + CuSO_4$	0	0	0
61	H_2SO_4 + hexylresorcinol	Fine air bubbles heat 0	Bubbles heat 0	Bubbles heat 0
62	K_2CrO_4	Yellow (A)	0	0
63	$Co(NO_3)$	Pink pinholes (A)	Greenish large tables (C)	Changes to purplish brown ish pink (C) ?
64	$Cr(NO_3)_2$	0	0	0
65	$CuSO_4$	Specks	Brownish tables	Brownish (C) ?
66	$AlK(SO_4)_2$	0	0	0
67	$MnSO_4$	0	0	0
68	$SnCl_2$	White (A)	White (A)	White (A)
69	$SrCl_2$	0	0	0
70	Uranium acetate	Yellow strings (A)	Yellow granules (A)	Yellow granules (A)
71	KOH + rochelle salts	White (C)	Sparse ppt tablets (A)	Sparse tablets and bundles (C)

0 = No color or ppt A = Amorphous ppt C = Crystalline ppt

with one drop of the reagent The development of colors and/or precipitates was followed by a hand lens or under a microscope In case a positive reaction developed, quantitative tests were made, using 10 millimolar solutions Since most of the precipitates were white, such reactions are recorded without differentiating between chalky-white, greyish white, yellowish white, brownish white or other shades of "white"

Little information regarding the chemical reactions of benzoylaconine and aconine were found Accordingly, 10 millimolar solutions were prepared and tested simultaneously with aconitine (Table II) In case positive results were obtained, confirmatory tests were conducted with other dilutions The 10 millimolar solutions were the most favorable for color tests Benzoylaconine may be differentiated from aconitine by confirmatory tests with a number of reagents, although no single reaction may be considered as absolutely definitive In further distinction, aconine may be differentiated from aconitine or benzoylaconine Only negative reactions were obtained with aconitic acid

TABLE III —SENSITIVITY OF TESTS FOR ACONITINE

No	Reagent.	Concentration in Millimols					
		4 0	0 4	0 04	0 004	0 0004	0 00004
	Taste test	0 02 cc bitter saliv tingling tongues and cheeks	Bitter tingling	Bitter tingling saliv	Bitter slight tingling	Bitter no tingle	No effect
18	Schiebler	Dense white (A)	Slight white (A)*	0	0	0	0
20	Ecolle	Fluffy white (A)	Slight white (A)*	0	0	0	0
24	Wagner	Curdy brown (A)	Lt brown ppt.*	0	0	0	0
26	Dragendorff	Immed dense white flocc (A)	Immed sparse white flocc (A)*	0	0	0	0
28	Mayer	Immed dense white flocc (A)	Immed sparse white flocc (A)	Slowly turbid opalescent white (A)*	0	0	0
31	$KMnO_4$	Purple (A)	Slight purple (A)*	0	0	0	0
48	Picric acid	Dense yellow (A)	Slight yellow (A)*	0	0	0	0
58	Dimethylgly oxine	White (A)*	0	0	0	0	0
68	$SnCl_2$	Curdy white (A)*	0	0	0	0	0

* Limit of sensitivity A = Amorphous ppt

Very little information was found in the literature regarding the sensitivity of various tests for aconitine (9, 14, 16, 18, 23) Those reagents which gave promising results were tested with various dilutions of aconitine, ranging from 4 millimolar down to 0 00004 millimolar (Table III) No positive reactions were obtained with 0 04 millimolar or weaker solutions except Mayer's reagent, which gave a positive reaction at 0 04 millimolar, and thus proved the most sensitive of the reagents studied The limiting concentrations for the other reagents are reported No efforts were made to study intermediate concentrations In making taste tests, 0 02–0 05 cc of solution was placed upon the tongue one minute later the mouth was thoroughly rinsed with tap water Taste phenomena were recorded for fifteen minutes (bitterness, tingling, etc)

In order to determine the toxicological applicability of these reagents (5, 15, 23), a post mortem examination was conducted upon a dog which had died following the oral administration of Tincture of Aconite, U S P X The stomach and contents, the intestine and contents, a portion of muscle of the thigh, the liver, one kidney and the spleen were removed and examined separately Each tissue was chopped fine and extracted with alcohol containing 1 per cent of tartaric acid

When extraction was complete, the material was filtered, the alcohol evaporated off on a water-bath at a low temperature, and the residue taken up with water After standing until solution appeared complete, this was filtered and the solvent evaporated off on a water-bath This process was repeated with alcohol and water a second time, yielding eventually a residue which was completely soluble in alcohol and water This was dissolved in 5 cc of distilled water and tested (Table IV) Since tincture of aconite had been administered to this dog daily over a period of several months, it might be anticipated that distribution in the cadaver would differ from that to be expected following acute poisoning Positive results were obtained in tests conducted on extracts of the stomach and intestine, indicating that absorption was not complete in the interval of ten hours since the administration of the last dose Strongly positive results were obtained in testing the liver, but negative results were obtained from the kidney, spleen and the muscles Following the administration of a single dose of an aconite preparation to dogs, positive reactions have been obtained in extracts of the liver, and doubtful or negative reactions in extracts of the kidneys It would appear that the aconite alkaloids are excreted largely into the liver

TABLE IV —TOXICOLOGICAL TESTS FOR ACONITINE IN VISCERA

No	Reagent	F E Aconite	Stomach	Intestine	Liver	Kidney	Spleen	Muscle
18	Schiebler	White (A)	Brown (A)	Brown (A)	0	0	0	0
20	Ecolle	White (A)	Brown (A)	Brown (A)	Brown (A)	Brown (A)	0	0
24	Wagner	Lt brown (A)	Lt brown (A)	Lt brown (A)	0	0	0	0
26	Dragendorff	Dark brown curdy (A)	Lt brown curdy (A)	Lt brown (A)	Flocculent (A)	Flocculent (A)	0	0
28	Mayer	Lt brown (A)	Lt brown (A)	Lt brown (A)	Lt brown (A)	0	0	0
31	$KMnO_4$	Brown (A)	Brown (A)	Brown no ppt	Brown (A)	0	0	0
48	Picric acid	Yellow (A)	Yellow (A)	Yellow (A)	Yellow (A)	0	0	0
58	Dimethylglyoxime	White (A)	Brown (A)	Brown (A)	Brown (A)	0	0	0
68	$SnCl_2$	0	Brown (A)	Brown (A)	Brown (A)	0	0	0

A = Amorphous ppt

CONCLUSION

1 The behavior of aconitine, benzoylaconine and aconine have been determined with 71 alkaloidal reagents Characteristic reactions for the differentiation of these three alkaloids have been developed

2 Mayer's reagent, which was the most sensitive chemical test for aconitine, had a limiting threshold at a concentration of 0 04 millimolar, the taste test detected tingling at 0 004 millimolar, and bitterness at 0 0004 millimolar concentrations

3 A substance giving the chemical reactions of aconitine has been detected in the liver, stomach and intestines of dogs, but not in the kidneys, spleen or muscle

AUTHORS' NOTE We wish to express our appreciation to Richard I Grantham and the late Dr Herman Engelhardt for the benzoylaconine and aconine used in this investigation

BIBLIOGRAPHY

(1) E P Alvarez Sopra un nuova reattivo dell'aconitina," *Gazz chim ital*, 39 (1909) 429–430

(2) W Autenrieth 'Laboratory Manual for the Detection of Poisons and Powerful Drugs" (1928), 6th Am Edition from 5th German

(3) E Barillot, "Traite de chimie legale" (1894), 202

(4) G Baudran, 'Wirkung von Calciumpermanganat auf die Alkaloide, speziel auf das Strychnin," *Compt rend acad sci*, 139 (1904), 1000–1002

(5) M W Blyth, 'Poisons Their Effects and Detection" (1906), 364

(6) F C Carr, 'Aconite Alkaloids," in "Allen's commercial organic analysis," 7 (1929), 227–268

(7) H W Cole, "Potassium Ferrocyanide as a Reagent in the Microscopic Qualitative Chemical Analysis of the Common Alkaloids" *Philippine J Sci*, 97 (1923), 101

(8) G Dragendorff, Plant Analysis" (1909), 179

(9) W R Dunstan and F H Carr, Aconitine a Characteristic Reaction Suitable for Its Detection," *Pharm J* (Feb 15, 1896), 122–123

(10) Ecolle, "Determination of Aconitine by Silicotungstic Acid," *J pharm chim*, 14 (1901), 97

(11) N Evers and G D Elsdon, 'Aconitine the Analysis of Drugs and Chemicals" (1929), 126

(12) E H Hankin, Tests for Certain Narcotic and Anesthetic Drugs" *Ind J Med Res* 4 (1916), 237–255

(13) W H Hartung, F C Crossley and J C Munch, 'Alkaloidal Reagents IV Quelques Remarques sur la Reaction Colorimetriques de Sivadjian pour Distinguer l'Ephedrine," *J pharm chim* (8) 13 (1931), 474–478

(14) L Lanoy, Sensitiveness of the General Method for Extracting Alkaloids from Water, ' *Compt rend*, 165 (1917), 360–362

(15) Mecke 'Uber ein dem Aconitin ahnliches Leichenalkaloid," *Z Öffent Chem*, 5 (1899), 204–206

(16) S Mellaneh, Color Reaction for Aconite" *Analyst* 46 (1921), 193–194

(17) Merck's Index (1930) 560

(18) N Monti Una nuova reazione dell'Aconitina," *Gazz chim ital*, 36 (1906), 477–480

(19) J C Munch, F C Crossley and W H Hartung, 'Alkaloidal Reagents I Introduction" Jour A Ph A, 20 (1931) 1037–1041

(20) J C Munch, F C Crossley and W H Hartung 'Alkaloidal Reagents II Aromatic Monohomocyclic Derivatives," *Ibid*, 21 (1932), 341–348

(21) J C Munch, F C Crossley and W H Hartung, 'Alkaloidal Reagents III Propadrin Its Homologs and Derivatives," *Ibid*, 21 (1932), 463–465

(22) B E Nelson, 'Variations in Quality of Vegetable Drugs" *Drug Circ*, 47 (1903), 137

(23) L P J Palet, 'A Reaction for Aconitine," *J pharm chim*, 19 (1919), 295–296

(24) F Peterson, W S Haines and R W Webster, "Legal Medicine and Toxicology," 2nd Edition, Vol 2 (1923)

(25) C Reichard 'Color Reactions of Aconitine," *Pharm Zentralh*, 46 (1905), 476

(26) H Ribait, Sur le Dosage de l'Aconitine par l'Acide Silicotungstique," *Bull sci pharmacol*, 17 (1910), 634

(27) A Richaud, 'Sur la Teneur en Aconitine de Quelques Echantillons d'Alcoolature de Feuilles d'Aconit," *J pharm chim*, 23 (1921), 15

(28) L Rosenthaler, "Value of Rufianic Acid as an Alkaloidal Precipitant," *Pharm Zentralh*, 71 (1930), 561 Through Yearbook, A Ph A, 19 (1930), 187

(29) F O Taylor, "Aconite," *Ind & Eng Chem*, 1 (1909), 549–567

(30) M Wagenaar, 'Microchemical Reactions of Aconitine," *Pharm Weekbl*, 67 (1903), 165 Through Yearbook A Ph A, 19 (1930) 180

Laboratories Sharp and Dohme,
Philadelphia, Pa

GAMMA RAYS

Discovery of a way to make sodium give out gamma rays has been announced by Prof Ernest O Lawrence at the University of California on October 20th The radiation it is believed, will open a promising field for cancer research and a further study of how radiation acts on living tissues

DETERIORATION AND STABILIZATION OF ACONITE PREPARATIONS PART I [1] [2]

BY WILLIAM B BAKER

INTRODUCTION

The reports of early investigators on the value of aconite as a therapeutic agent were more often conflicting than otherwise It is now believed that this was due primarily to the fact that the drug and its preparations decreased rapidly in potency due to the instability of aconitine, which is the physiologically active principle The fact that aconitine is not stable has been known for some time, but it was not until comparatively recent times that attempts to measure accurately its rate of deterioration have been made, and likewise to stabilize the preparations of aconite and aconitine

In their studies of the deterioration of aconite preparations Swanson (1), Squibb Research Laboratories (2) and Swanson and Hargreaves (3), found that these preparations deteriorated rapidly within a year It was shown that deterioration is due to the hydrolysis of aconitine into benzaconine and aconine, and that deterioration is directly dependent upon the hydrogen-ion concentration of aconite preparations

With the object in view of determining the rate of deterioration of aconite preparations (this paper covers only the tincture) and of determining which of the stabilizers in use are the most efficient, the following experimental studies were made Incidentally, the accuracy of the U S P X method of assay was also studied

EXPERIMENTAL

Preparation of Samples —Dried tubers of *Aconitum napellus* were subjected to examination by a botanist and found to be as represented with respect to identity The drug was reduced to a No 40 powder by grinding, and two tinctures of aconite were prepared Tincture No 1 was prepared in strict accordance with the U S P X procedure for Tincture of Aconite (7) Tincture No 2 was prepared by the same method, but with the addition of 2 per cent acetic acid to the 70 per cent alcoholic menstruum, a procedure recommended as being the most desirable to insure stability

The tincture was selected as the preparation for this study as it is the preparation of aconite most frequently used, and because it is typical of the other liquid preparations of aconite in so far as lack of stability is concerned

Tincture No 1 —120-cc portions of this tincture were measured off by a burette into eleven amber-colored bottles of 125 cc capacity Before filling, the bottles were immersed for 24 hours in water acidulated with 2 per cent hydrochloric acid, to neutralize any possible alkalinity of the glass, then thoroughly rinsed with water

---

[1] From the laboratories of A G Du Mez Professor of Pharmacy, and M R Thompson, Professor of Pharmacology, School of Pharmacy of the University of Maryland Compiled, in part, from a thesis submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfilment of the requirements for the degree of Master of Science, 1933

[2] Scientific Section, A PH A , Washington meeting 1934

Each portion, except one, which was used as a control, was acidified with a definite amount of acid as shown below, and the p_H values determined within a day or two

TABLE I —p_H VALUES OF PORTIONS

Portion	Per Cent Acid Added	p_H Value
1	None	5 7
2	0 1 hydrochloric acid	3 8
3	0 2 hydrochloric acid	2 4
4	0 3 hydrochloric acid	2 3
5	0 4 hydrochloric acid	1 9
6	2 0 acetic acid	4 6
7	2 5 acetic acid	4 5
8	3 0 acetic acid	4 45
9	3 5 acetic acid	4 4
10	4 0 acetic acid	4 3
11	2 0 hypophosphorous acid	1 15

Acetic and hydrochloric acids were used for acidifying as they had been used for this purpose by other investigators

Hypophosphorous acid was used because of its reducing properties and because it was thought that deterioration might be due, in part at least, to oxidation of the alkaloids The p_H value obtained for this portion was so low (p_H 1 15) that it appeared as though the amount of hypophosphorous acid added (2 per cent) was more than sufficient to give the value (approximately p_H 2 5–3 0), reported by other investigators as being the most desirable To determine if this was actually the case, 25 cc of non-acidified tincture were accurately measured off and adjusted for p_H value by adding successive small amounts of acid measured from a burette The following results were obtained

TABLE II —ADJUSTMENT OF p_H VALUE WITH HYPOPHOSPHOROUS ACID

Cc. of Hypophosphorous Acid Added	p_H Value
0 1	3 0
0 2	2 7
0 3	2 6
0 4	2 0

Tincture No 2 —One liter of tincture was prepared using a 70 per cent alcoholic menstruum acidulated with 2 per cent acetic acid The tincture was not divided into portions as in the case of Tincture No 1, but was preserved in one bulk for observation The p_H value of this tincture was found to be 4 80

The addition of the same percentage of an acid will give variable p_H values in preparations made from different lots of drugs, due to the variable amounts of alkaloids and inert extractive matter present Therefore, it is inadvisable to specify what percentage of acid should be added to the preparation for stabilizing purposes The p_H value that will give the greatest protection to the preparation should be stated instead

The results of this study show that the use of acetic acid, or even glacial acetic acid, as stabilizers, is impractical because of the comparatively large quantity which must be added to bring the p_H value down to the desired level The results presented in the following table demonstrate this clearly

TABLE III

Hydrochloric Acid: Amount of Acid Added to 30 Cc of Tincture	p_H Value	Acetic Acid (36%): Amount of Acid Added to 25 Cc of Tincture	p_H Value	Acetic Acid (Glacial): Amount of Acid Added to 30 Cc of Tincture	p_H Value.
None	5 48	None	4 8	None	4 77
0 1 cc	2 97	3 8 cc	3 7	0 5 cc	4 33
0 2 cc	1 74	6 2 cc	3 4	2 5 cc	3 85
		7 7 cc	3 3	4 5 cc	3 47
		10 0 cc	3 1	7 0 cc	3 17
		11 7 cc	3 0	9 0 cc	2 98
		13 6 cc	2 8	11 0 cc	2 82
		17 5 cc	2 7	14 0 cc	2 61
		23 4 cc	2 5	16 0 cc	2 53
				17 0 cc	2 43
Percentage of acid added to obtain p_H value of 1 74 = 0 66		Percentage of acid added to obtain p_H value of 2 50 = 93 60		Percentage of acid added to obtain p_H value of 2 43 = 56 66	

Assay of Samples —The method used for the assay of Tinctures Nos 1 and 2 is the one described in the U S P X (7) under Tincture of Aconite The samples prepared were assayed at intervals of approximately three months

The portions to be assayed were diluted so that the dose to be administered to the animal would come within a convenient injection range (0 4–1 cc) Warm tap water, chlorine free, was used for making the dilutions

TABLE IV —RATE OF DETERIORATION OF TINCTURE NO 1

			Date of Assay							
Portion	Acid Used	p_H	10–29–31 Per Cent Strength	1–29–32 Per Cent Strength	5–2–32 Per Cent Strength	8–2–32 Per Cent Strength	11–28–32 Per Cent Strength	3–12–33 Per Cent Strength	3–8–34 Per Cent Strength	p_H
1	None	5 7	114	66	Below 50					5 56
2	HCl	3 8		89	80			Below 50		4 40
3	HCl	2 4		100		89	72			2 89
4	HCl	2 3		114		114		114	114	2 85
5	HCl	1 9		114		114	114	100		2 36
6	CH_3COOH	4 6		100	66	Below 50				4 72
7	CH_3COOH	4 5		100			Below 50			4 63
8	CH_3COOH	4 45		89	80					4 56
9	CH_3COOH	4 4		100		100	Below 50			4 57
10	CH_3COOH	4 3		114	114	114	Destroyed			
11	H_3PO_2	1 15		114	114	114	80	72		1 46

The U S P X (7) gives the minimum lethal dose for Tincture of Aconite as 0 00035 cc to 0 00045 cc per Gm weight of guinea pig Therefore, a tincture, the minimum lethal dose of which is found to be 0 00040 cc per Gm weight of animal, would be considered to be 100 per cent with respect to the U S P standard

Immediately after preparation, Tinctures Nos 1 and 2 were assayed and found to have a potency of 114 per cent

The acid used to acidify the portions of Tincture No 1 apparently had no effect on the animals, as the minimum lethal dose was found to be the same in all cases, as shown in the table which follows This table also shows the rate of deterioration as revealed by assays made at intervals, in all but one instance, of approximately three months

The stabilizing effect of the addition of acid is clearly shown by the foregoing results Tinctures prepared *without the addition of acid deteriorate rapidly* Hydrochloric acid is shown to be the best stabilizer of the acids employed This is demonstrated particularly well by the assay results for "portion 4" of Tincture No 1, which had an initial p_H value of 2 30 In this case, hydrochloric acid appears to have afforded complete protection over a period of twenty-nine months In other portions acidified with hydrochloric acid the protection was not so striking, deterioration increasing with an increase in p_H value

TABLE V —RATE OF DETERIORATION OF TINCTURE NO 2

	Date of Assay				
	10–29–31 Per Cent Strength	1–29–32 Per Cent Strength	8–2–32 Per Cent Strength	3–12–33 Per Cent Strength	
p_H					p_H
4 8	114	100	89	72	4 94

Acetic acid proved less efficient than hydrochloric acid It retarded deterioration to a moderate extent when added in sufficient amount When acetic acid was added to the menstruum instead of the percolate, as shown by Tincture No 2, deterioration also took place, although not to the same extent as when the same percentage of acid had been added to the percolate as is the case in "portion 6" of Tincture No 1

Hypophosphorous acid, likewise, afforded only moderate protection

Based on the foregoing results it may, therefore, be said that hydrochloric acid is preferable to acetic acid as a stabilizer for tincture of aconite for the following reasons

I It possesses greater ionizing power than acetic acid

II Having better ionizing properties, much less hydrochloric acid is necessary for adjusting the preparation to the desired p_H value than when acetic acid is used

Hydrochloric acid is preferable to hypophosphorous acid as a stabilizer for tincture of aconite because it possesses greater ionizing power and is more economical

Approximately four months after Tinctures Nos 1 and 2 had been prepared, two other tinctures were prepared from the same lot of drug These two tinctures were numbered 3 and 4, respectively

Tincture No 3 —This tincture was prepared from the same lot of powdered aconite tubers used in preparing Tinctures Nos 1 and 2, the only difference being that in this case the drug had been in the powdered condition for four months, whereas in the preceding cases the drug was ground just before the preparation of the tinctures was begun

Tincture No 4 —This tincture was prepared from the drug which had been *kept whole*, and powdered at the end of the four-month period

The two tinctures, prepared as described, were assayed for potency with the following results

TABLE VI —RATE OF DETERIORATION OF DRUG

Tincture	Strength in Per Cent.	Assay Date
No 3	57	2–15–32
No 4	73	2–15–32

In the case of Tincture No 3 where the aconite had been kept over a period of four months in the powdered condition before being made into tincture, the drug shows a loss of 57 per cent, or about half of its strength compared with the results obtained in the initial assays of Tinctures Nos 1 and 2

In the case of Tincture No 4 where the aconite had been kept over this period of time in the *whole* condition before being made into tincture, the drug shows a loss of 41 per cent compared to the initial strengths of Tinctures Nos 1 and 2

It appears, therefore, that aconite should not be kept in the powdered condition for any lengthy period of time, but that it should be stored in the whole condition and powdered just previous to making up into tincture or other preparation

Aconitine —Swanson and Walters (8) assert that the deterioration of aconite preparations cannot be definitely determined until a more satisfactory method of assay has been developed Swanson (1) feels that the lethal dose method would be satisfactory for testing the therapeutic efficacy of aconite, providing the total alkaloids were determined in terms of a standard aconitine, and a standard method of technique was employed

With the intention, therefore, of studying the seasonal variation of guinea pigs (their susceptibility to a stable standard substance at different intervals during the year), and of the use of aconitine as the standard, the following work was undertaken

Crystalline aconitine (Aconitine Potent, Merck) was recrystallized repeatedly from hot alcohol until its toxicity to guinea pigs became constant This aconitine, used as a standard throughout the work, was recrystallized six times The crystals were then dried thoroughly, and sealed *in vacuo* in portions of 20–30 mg to the ampul

"Aconitine values," using this pure crystalline aconitine, were determined at each interval of assay of the Tinctures Nos 1 and 2 (approximately three-month intervals) A 1 50,000 dilution of hydro-alcoholic solvent (about 25 per cent alcohol) constituted the working solution for injection

Healthy, normal guinea pigs were used for the determination of the aconitine values These animals had been obtained from one source only, and had been acclimated to laboratory surroundings before being used for assay purposes

The U S P X method of assay as directed under Tincture of Aconite (7) was followed in the determination of the minimum lethal dose as in the case of the tinctures assayed

TABLE VII —ACONITINE VALUES GM ACONITINE PER GM WEIGHT OF GUINEA PIG

10-29-31	1-29-32	5-2-32	8-2-32	11-28-32	3-15-33
0 000000050	0 000000055	0 000000050	0 000000055*	0 000000055	0 000000050

* In obtaining the 'aconitine value" on date of 8-2-32 ' the weight of one of the guinea pigs used was 465 Gm , which is considerably beyond the U S P range This procedure was made necessary, however, due to a shortage of guinea pigs at that time Apparently, however this did not affect the results to any noticeable extent

The foregoing aconitine values show that no appreciable change in susceptibility of the guinea pigs to the aconitine took place in 15 months This is explained by the fact that the guinea pigs used were in an absolutely healthy, normal condition and had been obtained from one source only This, probably, would not be the

case if the condition of the guinea pigs was poor, if the animals had not been acclimated to laboratory surroundings and if they had been obtained from various sources This matter is receiving further consideration

CONCLUSIONS

1 The use of hydrochloric acid as a stabilizer for tincture of aconite is superior to acetic acid, provided the preparation is adjusted to the correct hydrogen-ion concentration

2 The use of acetic acid as a stabilizer is impractical because of the large amount required to adjust the preparation to the desirable hydrogen-ion concentration

3 Aconite in the form of the whole crude drug deteriorates rapidly and the powdered drug deteriorates even more rapidly

4 Tincture of Aconite U S P X, because of its poor keeping qualities, should be adjusted with hydrochloric acid to a hydrogen-ion concentration sufficient to preserve it (approximately, p_H 2 3–3 0)

5 The resistance of guinea pigs to aconite, or aconitine, is consistent provided the weight range specified by the U S P X is strictly adhered to, and further provided that these guinea pigs are in an absolutely healthy, normal condition

6 The advisability of the use of aconitine as a bioassay standard will receive more extensive consideration in a later report

REFERENCES

(1) E E Swanson, Jour A Ph A , 13 (1924) 1108–1112
(2) Anonymous, *Squibb Memoranda*, 15 (1928), No 2
(3) E E Swanson and C C Hargreaves, Jour A Ph A , 16 (1927), 296–301
(4) H A B Dunning' *Proc A D M A* (1921), 234
(5) G L Jenkins and A G DuMez, Quantitative Pharmaceutical Chemistry," 1st Edition (1931) 341–346
(6) Leeds and Northrup Co , Phila Pa , Standard Conversion Tables, 6–7
(7) Pharmacopœia of the United States, X, 30
(8) E E Swanson and A L Walters, Jour A Ph A , 12 (1923), 957–963
(9) F H Carr, in ' Allen's Org Comm Anal ," 5th Edition, 7 (1929), 227–265
(10) E H Farr and R Wright *Pharm J* , 90 (1913), 216–217
(11) J C Munch and H H Crosbie, Jour A Ph A , 18 (1929), 986–992
(12) A Tschirch "Handbuch der Pharmacognosie " Sec 1 (1923), 562–566
(13) A R L Dohme, Jour A Ph A , 10 (1921), 428–430
(14) P S Pittenger, *Ibid* , 6 (1917), 869
(15) H C Colson, *Ibid* 9 (1920), 305
(16) C C Haskell, *Am J Pharm* , 88 (1916), 243–246
(17) J C Munch and G S Gittinger Jour A Ph A , 18 (1929), 17–23
(18) C C Haskell and H W Zirkle, *Ibid* , 87 (1915), 537–540
(19) J C Munch and R I Grantham, *Ibid* , 18 (1929), 993–995

Henry Ford says he has had hunches, but what others call hunches he calls memories of things learned in past lives, ' study the past " he says "and you will see that the congresses and the crowds were always arguing irrelevant and unimportant issues while the real revolution was going on quietly in the laboratory "

In the case of Tincture No 3 where the aconite had been kept over a period of four months in the powdered condition before being made into tincture, the drug shows a loss of 57 per cent, or about half of its strength compared with the results obtained in the initial assays of Tinctures Nos 1 and 2

In the case of Tincture No 4 where the aconite had been kept over this period of time in the *whole* condition before being made into tincture, the drug shows a loss of 41 per cent compared to the initial strengths of Tinctures Nos 1 and 2

It appears, therefore, that aconite should not be kept in the powdered condition for any lengthy period of time, but that it should be stored in the whole condition and powdered just previous to making up into tincture or other preparation

Aconitine —Swanson and Walters (8) assert that the deterioration of aconite preparations cannot be definitely determined until a more satisfactory method of assay has been developed Swanson (1) feels that the lethal dose method would be satisfactory for testing the therapeutic efficacy of aconite, providing the total alkaloids were determined in terms of a standard aconitine, and a standard method of technique was employed

With the intention, therefore, of studying the seasonal variation of guinea pigs (their susceptibility to a stable standard substance at different intervals during the year), and of the use of aconitine as the standard, the following work was undertaken

Crystalline aconitine (Aconitine Potent, Merck) was recrystallized repeatedly from hot alcohol until its toxicity to guinea pigs became constant This aconitine, used as a standard throughout the work, was recrystallized six times The crystals were then dried thoroughly, and sealed *in vacuo* in portions of 20–30 mg to the ampul

"Aconitine values," using this pure crystalline aconitine, were determined at each interval of assay of the Tinctures Nos 1 and 2 (approximately three-month intervals) A 1 50,000 dilution of hydro-alcoholic solvent (about 25 per cent alcohol) constituted the working solution for injection

Healthy, normal guinea pigs were used for the determination of the aconitine values These animals had been obtained from one source only, and had been acclimated to laboratory surroundings before being used for assay purposes

The U S P X method of assay as directed under Tincture of Aconite (7) was followed in the determination of the minimum lethal dose as in the case of the tinctures assayed

TABLE VII —ACONITINE VALUES GM ACONITINE PER GM WEIGHT OF GUINEA PIG

10–29–31	1–29–32	5–2–32	8–2–32	11–28–32	3–15–33
0 000000050	0 000000055	0 000000050	0 000000055*	0 000000055	0 000000050

* In obtaining the 'aconitine value ' on date of '8–2–32 ' the weight of one of the guinea pigs used was 465 Gm , which is considerably beyond the U S P range This procedure was made necessary however due to a shortage of guinea pigs at that time Apparently however this did not affect the results to any noticeable extent

The foregoing aconitine values show that no appreciable change in susceptibility of the guinea pigs to the aconitine took place in 15 months This is explained by the fact that the guinea pigs used were in an absolutely healthy, normal condition and had been obtained from one source only This, probably, would not be the

case if the condition of the guinea pigs was poor, if the animals had not been acclimated to laboratory surroundings and if they had been obtained from various sources This matter is receiving further consideration

CONCLUSIONS

1 The use of hydrochloric acid as a stabilizer for tincture of aconite is superior to acetic acid, provided the preparation is adjusted to the correct hydrogen-ion concentration

2 The use of acetic acid as a stabilizer is impractical because of the large amount required to adjust the preparation to the desirable hydrogen-ion concentration

3 Aconite in the form of the whole crude drug deteriorates rapidly and the powdered drug deteriorates even more rapidly

4 Tincture of Aconite U S P X, because of its poor keeping qualities, should be adjusted with hydrochloric acid to a hydrogen-ion concentration sufficient to preserve it (approximately, p_H 2 3–3 0)

5 The resistance of guinea pigs to aconite, or aconitine, is consistent provided the weight range specified by the U S P X is strictly adhered to, and further provided that these guinea pigs are in an absolutely healthy, normal condition

6 The advisability of the use of aconitine as a bioassay standard will receive more extensive consideration in a later report

REFERENCES

(1) E E Swanson, Jour A Ph A , 13 (1924), 1108–1112
(2) Anonymous, *Squibb Memoranda*, 15 (1928), No 2
(3) E E Swanson and C C Hargreaves, Jour A Ph A , 16 (1927), 296–301
(4) H A B Dunning, *Proc A D M A* (1921) 234
(5) G L Jenkins and A G DuMez, ' Quantitative Pharmaceutical Chemistry," 1st Edition (1931) 341–346
(6) Leeds and Northrup Co , Phila Pa , Standard Conversion Tables, 6–7
(7) Pharmacopœia of the United States, X, 30
(8) E E Swanson and A L Walters, Jour A Ph A , 12 (1923) 957–963
(9) F H Carr in "Allen's Org Comm Anal ," 5th Edition, 7 (1929), 227–265
(10) E H Farr and R Wright, *Pharm J* , 90 (1913), 216–217
(11) J C Munch and H H Crosbie Jour A Ph A , 18 (1929), 986–992
(12) A Tschirch "Handbuch der Pharmacognosie," Sec 1 (1923) 562–566
(13) A R L Dohme Jour A Ph A , 10 (1921), 428–430
(14) P S Pittenger, *Ibid* 6 (1917), 869
(15) H C Colson, *Ibid* 9 (1920), 305
(16) C C Haskell, *Am J Pharm* , 88 (1916), 243–246
(17) J C Munch and G S Gittinger Jour A Ph A , 18 (1929), 17–23
(18) C C Haskell and H W Zirkle, *Ibid* , 87 (1915), 537–540
(19) J C Munch and R I Grantham, *Ibid* , 18 (1929), 993–995

Henry Ford says he has had hunches but what others call hunches he calls memories of things learned in past lives, "study the past " he says ' and you will see that the congresses and the crowds were always arguing irrelevant and unimportant issues while the real revolution was going on quietly in the laboratory "

DRUG EXTRACTION I A STUDY OF VARIOUS MENSTRUA FROM THE STANDPOINT OF SWELLING EFFECTS, PENETRATION AND EXTRACTION

BY WILLIAM J HUSA AND LOUIS MAGID

(*Continued from page 901, September Journal*)

Swelling of Powdered Belladonna Root—Studies of the swelling of powdered drugs are obviously of importance, since this is the form in which drugs are extracted Scoville (2) measured the swelling of a ground drug, 5 Gm of gentian in about a No 30 powder being placed in a specially graduated 25-cc cylinder and the volume measured before and after treatment with a liquid, allowing time for settling The error caused by the buoyant effect of the liquid on the drug particles was recognized by Scoville

In the present study this method was improved by centrifuging the mixture of drug and solvent, thus overcoming the buoyant effect of the solvent and obtaining a rather complete and sharp separation of liquid and solid Graduated centrifuge tubes of 15 cc capacity were used in a large size centrifuge (Size 1, Type SB, operating at 5 amperes, 110 volts, 60 cycles, made by the International Equipment Co) The centrifuge was run close to maximum speed, which was kept constant throughout the experiments Except where otherwise specified, 0 50 Gm of powdered drug and 8 0 cc of liquid were used in the experiments, these amounts being found to be most practical The mixtures of powdered drug and liquid were centrifuged for ten minutes which was the time ascertained by trial as necessary for complete packing In stating the results, the ten minutes of centrifuging is included in the maceration time The tests were conducted in duplicate, the volume of the powdered drug being read off on the graduated centrifuge tubes

TABLE XVI —SWELLING OF BELLADONNA ROOT (IN NO 40 POWDER) IN VARIOUS MENSTRUA

Menstrua Volume of			Dry	Time of Maceration in Minutes							
Glycerin	Alcohol	Water	0	10	20	40	60	120	360	720	1440
0	0	1	100	161	161	152	161	161	166	171	152
0	1	7	100	152	161	161	161	152	152	161	142
0	1	3	100	142	138	138	142	142	138	142	133
0	1	1	100	123	133	123	128	123	114	114	114
0	7	3	100	119	119	109	114	114	109	114	109
0	5	1	100	104	114	109	114	104	104	109	104
0	9	1	100	114	114	114	114	114	104	104	104
0	1	0	100	114	114	114	104	100	104	104	100
1	0	3	100	138	142	142	142	142	142	142	152
1	0	1	100	138	142	142	142	142	142	142	152
4	0	1	100	123	128	138	142	142	142	142	152
1	3	0	100	104	109	109	109	109	109	109	119
1	1	0	100	104	104	104	104	109	114	114	119
4	1	0	100	100	100	114	114	114	119	133	133
65	250	685	100	119	119	119	119	119	123	128	128
100	500	400	100	104	104	100	104	104	104	104	114
75	675	250	100	104	104	100	100	100	109	104	104

Swelling of Belladonna Root in Various Menstrua—Through a reputable dealer and miller of crude drugs a 125-pound shipment of belladonna root U S P

was obtained as follows 10 lbs whole root, 40 lbs of 40 mesh and 25 lbs each of 20, 60 and 80 mesh, prepared according to the following specifications "The above to be prepared by taking 125 pounds of belladonna root, selecting a representative sample of 10 pounds for the whole root and a representative 40-lb sample to be milled to 40 mesh and three 25-lb samples to be milled to 20, 60 and 80 mesh, respectively Each 25-lb (or 40-lb) portion is to be milled separately so that each portion will be as nearly alike as possible except for the difference in the milling" It was thought that by use of this 125-pound supply of the drug, all experiments would be strictly comparable A thorough study of the shipment was made by C L Huyck, and it was found that the drug conformed to the U S P requirements

For concise presentation, the results in the tables which follow represent the average of two determinations, expressed on a percentage basis, the volume of the dry drug being taken as 100

With alcohol-water mixtures the results indicate that the swelling decreases with increasing alcoholic content The No 40 powder reached a maximum swelling in the first ten minutes in the alcohol-water mixtures, the later noticeable fall in percentage swelling may be due to a softening of the drug after prolonged contact with the liquid and subsequent firmer packing by the centrifugal force

In glycerin-water mixtures, the final swelling was the same regardless of whether the liquids were present in equal amounts, or whether the glycerin or water was in excess, however, the mixture of glycerin 4 vol —water 1 vol required a longer time for reaching maximum swelling In glycerin-alcohol mixtures there was less swelling than in glycerin-water mixtures In glycerin-alcohol-water mixtures the swelling after 24 hours was greater with the mixtures having the greater proportion of water

Effect of Fineness of Powder on Swelling —Using the official menstruum specified by the U S P X for Fluidextract of Belladonna Root, *i e*, a mixture of alcohol 5 vol —water 1 vol, tests were conducted by the centrifuge method on belladonna root in No 20, 40, 60 and 80 powder

TABLE XVII —SWELLING OF BELLADONNA ROOT OF DIFFERENT DEGREES OF FINENESS IN A MIXTURE OF ALCOHOL 5 VOL —WATER 1 VOL

Powder No	Dry	Time of Maceration in Minutes							
	0	10	20	40	60	120	360	720	1440
20	100	113	117	113	113	113	130	130	117
40	100	100	104	109	109	104	104	114	104
60	100	100	100	100	100	105	105	105	105
80	100	105	110	115	115	115	115	115	115

The volume occupied by a given weight of powdered drug would naturally be greater for the coarser powders, since large particles pack less efficiently than small particles in a given space The results in Table XVII indicate that for the No 20, 40 and 60 powders, the larger the powder, the greater the apparent swelling, this may be due to the fact that as the larger particles swell, the packing becomes still less efficient An opposing tendency, however, arises in the fact that swelling takes place largely near the surface, so that small particles should show a greater percentage swelling on the basis of this factor taken by itself In the No 80 powder, the greater swelling as compared with the No 40 and 60 powders may be due

to an overbalancing of the factor of efficiency of packing by the factor of the increased coefficient of swelling in smaller particles

Effect of Proportion of Liquid in Maceration on Swelling—This point was considered from the standpoint of the effect on percentage swelling in maceration preliminary to packing in a percolator Tests have been carried out by the centrifuge method, by the use of an oedometer (3), and by a packing method using a graduate

For tests of swelling of drug powders with small amounts of moistening liquid, a further study of methods is required, since the results obtained by the different techniques are contradictory to a certain extent, however, the results seem to indicate that maximum swelling is not attained with amounts of liquid ordinarily used in moistening drug powders preparatory to packing in a percolator

Discussion of Results on the Swelling Effect of Solvents—The drying of a drug represents primarily a removal of water, although other secondary changes occur Tissues are originally more or less saturated with water and a marked decrease in size results from drying, due perhaps in greatest measure to loss of turgidity and collapse from loss of water From these considerations it would be natural to consider swelling as primarily a reversal of the drying process, with some differences due to the irreparable damage to the plant protoplasm during the drying The hydration of such dried material (4) would take place as in other dead material by means of imbibition and adsorption with osmosis by the action of vacuolar materials almost eliminated This illustrates the botanical maxim that when a living cell dies, it loses its osmotic powers

While water seems to be the natural swelling agent, some other liquids such as alcohol resemble water sufficiently to be taken up by the tissues It would seem that, in order to cause swelling a liquid must permeate the tissues and wet the inner surfaces The swelling by absolute alcohol would be an example of this, it is possible that the momentary shrinkage caused by absolute alcohol is due to the abstraction of water from the tissues and that the swelling which follows is due to the gradual permeation of the cells by absolute alcohol In the tests on swelling of strips of chestnut wood in absolute alcohol it was recognized that there was a possibility that the absolute alcohol on the slide might take up sufficient moisture from the air to affect the results However, the tests on blocks of chestnut wood were carried out in stoppered and sealed flasks thus eliminating any possible effect of moisture from the air and it was thus established that the swelling effects are due to absolute alcohol itself

The slower approach to equilibrium in the glycerin-water and alcohol-water mixtures might be thought of as due to a slower permeability of the cells to the alcohol water and glycerin water mixtures

The fact that concentrated glycerin solutions cause only one per cent of swelling may be due to the stability of glycerin hydrates, or to a lack of permeability of the cells to concentrated glycerin solutions The well known affinity of glycerin for water is probably due in part to the formation of hydrates Such water of hydration would not be available for hydration of the dried plant tissues unless these had a greater attraction for the water than the glycerin had, in other words the distribution of water between the tissues and the glycerin would depend upon the composition and relative stability of the respective hydrates Glycerin caused a shrinkage of the blocks of chestnut wood, followed by recovery and gradual swelling The results are reminiscent of the observation by Klebs (5) in 1888, that plant cells placed in a solution of glycerin first underwent plasmolysis and then gradually recovered, thus indicating gradual permeation by the glycerin

Ethylene glycol, diethylene glycol and carbitol cause about the same percentage swelling as does water, except that water comes to equilibrium much more rapidly Propylene glycol and dioxan caused less swelling than alcohol

In general the results with the glycerin water, glycerin alcohol and alcohol-water mixtures indicate that the swelling in mixtures of two liquids is practically an average of the effect of the liquids themselves when allowance is made for the relative proportions of the two liquids in the mixture An examination of the graphs (see Graphs 1 and 2) indicates that the general form

of the swelling curves is very similar for alcohol-water and glycerin-water mixtures However, there are some noteworthy differences, in that a smaller proportion of glycerin than of alcohol is required to bring about a decrease in the primary swelling and a lengthening of the period necessary for the attainment of equilibrium, and in that the addition of one part of water to 9 parts of glycerin has no effect on the swelling curve, but in the corresponding alcohol-water mixture there is a difference

The results of the work on strips of chestnut wood indicated that a variation in p_H in aqueous solutions had no effect on the swelling, but in the work on blocks of chestnut wood it was found that 0 01*N* aqueous HCl and NaOH both slightly increased the swelling In alcohol, swelling of woody tissues is decreased by acids, noticeably in 0 1*N* concentration Alcoholic NaOH decreased the swelling of blocks of chestnut wood, while in the work with strips of chestnut wood alcoholic NaOH increased the swelling The swelling with strips may be due to a weakening action of the NaOH on the thin sections used MacDougal (4) also found that tissues swelled more in alkaline solutions, he states further that ' acids decrease the hydration capacity of agar and of the pentosans which enter into the composition of certain types of plant cells " The effects of acid and alkali in alcoholic solution are noticeable particularly in cases where the alkali or acid are present in the alcohol when it is first added to the dry wood If the wood has already been acted upon by the alcohol before the addition of alcoholic acid or alkali, the effect is less noticeable After a tissue has been treated with alcoholic acid or alkali, treatment with alcohol is able to reverse the effect of the acid or alkali only partially This result is in accord with the statement of MacDougal (4) that "no swelling agent yet tested has been found to reverse the action of another solution so fully as to bring the dimensions of the sections down to the dimensions which might have been attained in the second agent alone " However, the results obtained on successive additions of solvents show that water, alcohol and absolute alcohol each have a characteristic effect on the tissues and that this individual effect tends to assert itself regardless of whether the solvent is applied to a dried tissue or to one that has already been treated with another solvent

Comparative Swelling with Grain and across Grain —Current theories regarding the structure of the cell wall offer an explanation for the fact that swelling of wood is greater across the grain than with the grain In 1858, Nageli (6) proposed a theory that the cell wall consists of ultramicroscopic, crystalline, molecular complexes, which he called micellæ, and which were supposed to be arranged spirally Likewise, in 1924 Koehler (7) stated that theoretically the cell walls are made up of ultramicroscopic fibrils running spirally in the cell walls, the water being held almost entirely between the fibrils According to Schorger (8) each micella is normally surrounded by a film of water, but in the dry condition the micellæ are drawn together On exposure to water, 'swelling takes place up to the point where the pressure of the aqueous layers equals the cohesion between the micellæ "

On the basis of X-ray investigations Sponsler (9) concluded that the structural units of the cell walls of fibres are $C_6H_{10}O_5$ molecules attached in chains running parallel to one another and very uniformly spaced According to Sponsler and Dore (10) the $C_6H_{10}O_5$ molecules themselves are held together to form chains by bonds of primary valence while the chains are associated and held together by bonds of secondary valence They state that since the $C_6H_{10}O_5$ molecules are held together by primary valence, water molecules cannot penetrate between them and consequently longitudinal swelling of cellulose fibres cannot occur to any great extent The swelling across grain is explained on the basis that water is able to penetrate between the chains, which are held together by secondary valence only The water molecules become adsorbed upon the oxygen atoms, thus increasing the distance between the parallel chains and causing swelling

Swelling of Fresh and Dried Woody Tissues —There is practically no swelling of the fresh blocks of oak sapwood and of Elberta peach wood in liquids However, the fresh oak sapwood absorbed 12 per cent of its weight of water and the fresh Elberta peach wood absorbed 42 per cent of its weight of water during the time of the experiment This situation is explained on the basis that the liquids which enter open spaces in the wood do not cause swelling but merely occupy space which was previously filled with air Thus Hawley and Wise (11) have stated that the water held in the microscopic cell cavities does not cause swelling of wood According to Detmer (12) the mere filling of the lumina of the wood elements with water cannot bring about

any increase in volume of the material, but only the liquid imbibed by the solid substance causes swelling Detmer states that *imbibition* is by no means capillarity, a fluid entering by capillarity occupies previously existing spaces, while when imbibition takes place, the molecules of the liquid push in between the micelles actually making space for themselves and thus bringing about an increase in volume These considerations make clear how a liquid may be absorbed in quantity in the open spaces in the plant tissues and yet may not cause appreciable swelling either because the micelles are already distended as in fresh wood or because the liquid does not have the proper ties facilitating imbibition as distinguished from capillarity Steel (13) takes the view that when a substance absorbs a liquid without swelling, the cohesion of the molecules of the substance is too great to permit them to be forced apart by the liquid

In studying the data concerning the effect of water and other liquids on blocks of woody tissues dried to constant weight, we find that recovery of original size occurs to a greater extent and at a more rapid rate with the blocks dried at room temperature than with the ones dried in an oven at 90° C These results are in accord with the general rule of colloid chemistry that gels which have been partially dehydrated have a lowered capacity for reimbibing water This has sometimes been explained on the basis that during drying the salts and other dissolved substances are finally left in a concentrated form on the tissue surfaces, and thus affect imbibition in a different manner than when diffused in dilute form

Effect of Thickness of Woody Tissue on Swelling—MacDougal (4) showed that in thin sections, the coefficient of expansion is relatively high and solvation is attained quickly Our results are in agreement, thus the chestnut wood blocks increased only 7 per cent in thickness while the thin sections (0 05 mm) increased 20 per cent in width Cells at or near the surface of a section or block may swell until the forces causing swelling are counter-balanced by the elastic force of the stretched cell wall Cells on the interior of a block in order to swell, must overcome not only the elastic forces of their own cell walls but also the restrictions of the surrounding cells in blocks possessing considerable rigidity it can be readily understood that the inner cells must swell less than the outer cells and thus the coefficient of expansion is relatively low in thick pieces or blocks In a block the outer layers would cause the greater amount of swelling This is in accord with our results, which show that the greater part of the swelling of blocks took place in considerably shorter time than was necessary for the liquids to penetrate to the center of the blocks *(To be continued)*

STUDIES ON STRYCHNINE III THE EFFECTIVENESS OF SUCROSE, SACCHARIN AND DULCIN IN MASKING THE BITTERNESS OF STRYCHNINE *[1]

BY JUSTUS C WARD, JAMES C MUNCH,[2] H J SPENCER AND F E GARLOUGH

Earlier papers in this series (1, 2) on the masking of the bitter taste of strychnine gave the results of experiments with a number of chemically unrelated substances The results obtained with 1 5 and 10 per cent sucrose solutions suggested the desirability of continuing and extending studies with sucrose as well as with other sweetening agents

In the series of tests reported in this communication, strychnine alkaloid, sulphate and hydrochloride were obtained from several manufacturers Chemical tests showed the purity of the products used The sucrose was a sample of factory run beet sugar Soluble saccharin and *p*-phenetylurea (dulcin) were obtained from commercial sources The technic used in our previous studies was followed here Five cc of a solution of strychnine and 5 cc of a solution of the sweetening agent

* Scientific Section Miami meeting 1931

[1] Bureau of Biological Survey U S Department of Agriculture

[2] Sharp and Dohme, Glen Olden, Penna

were mixed The mixture was retained in the mouth for exactly one minute and then ejected Two principal observations were made (1) the instant at which the bitter taste was first perceptible, and (2) the effect of the bitterness on the strength of the sweet taste Two individuals (W and S) were consistently available, so most of the figures presented are averages of the results obtained by them The other investigators made similar studies, but not in such detail Their results are in substantial agreement A considerable period of time was allowed to elapse between taste tests to avoid the possible potentiation of strychnine taste In a series of studies on this point we have found that an interval of fifteen to thirty minutes between tastes is desirable

The threshold taste limens of the sweetening agents and of the strychnine compounds were first determined The concentration of the sweetening agent was then increased to 10, 20, 30, 40, 50, 60, 80 and 100 times its threshold, and the limen for the strychnine compound determined at each sweetness concentration The experiments to determine the efficiency of each of the three sweetening agents in masking bitter taste were conducted as separate tests The thresholds for the unmixed solutions are given in Table I The values for the strychnine products are in substantial agreement with the average values obtained upon five individuals in the previous tests, and on forty students tested at Temple University during the last two years

TABLE I —THRESHOLD TASTE LIMENS OF HUMAN BEINGS

Product	Threshold Concentration Millimols/Liter	Gamma/5 Cc
Sucrose	22 20	38 000
Saccharin	0 067	80
Dulcin	0 10	90
Strychnine as		
Alkaloid	0 00347	5 8
Sulphate	0 00323	5 4
Hydrochloride	0 00323	5 4

TABLE II —TASTE LIMENS FOR SUCROSE STRYCHNINE TESTS

Concentrations as millimols/liter

Sucrose	Strychnine in the Form of Alkaloid	Sulphate	Hydrochloride
0	0 00347	0 00323	0 00323
22	0 00333	0 00333	0 00323
222	0 00363	0 00348	0 00363
444	0 00572	0 00500	
667	0 00800	0 00616	0 00667
890	0 01142	0 01142	
1110	0 02000	0 02000	0 01820
1330	0 03330	0 02500	
1785	0 03330	0 03640	0 03640
2220	0 05000	0 05720	0 04440

The relative sweetness of saccharin and of dulcin in terms of sucrose has been studied by previous investigators, and divergent conclusions reached because of the variations in concentrations used as "isodulceous" standards Saccharin has been reported to be 200 to 700 times as sweet as sucrose (3) and the threshold concentra-

tions reported to be 10 mg per liter This would correspond to 50 gamma of saccharin in the 5-cc portion tasted in our technic We find the absolute quantity of saccharin detectable under our conditions to be 80 gamma The threshold taste concentrations for sucrose reported in the literature vary from 5 mg to 60 mg in 5 cc , although the absolute quantities claimed to have been detected are 3 gamma and 58 gamma In our experiments 38 mg (38,000 gamma) proved to be the limiting quantity This would mean that saccharin is 38,000/80 or 475 times as sweet as sucrose under our testing conditions

Similarly, dulcin has been reported to be 70 to 350 times as sweet as sucrose, according to the sucrose concentration with which it was compared In our tests the threshold was 90 gamma, or it was 38,000/90 or 420 times as sweet as sucrose It is probable that the sample of dulcin used in these tests was purer than the samples used by other investigators

The detailed findings of the taste limens for strychnine in the form of the alkaloid, the sulphate and the hydrochloride in sucrose solutions are given in Table II The first line shows the concentration in millimols per liter in aqueous solution which just produced the characteristic strychnine bitterness taste The succeeding figures show the thresholds with increasing concentrations of sucrose A sucrose solution, ten times its threshold concentration, had only a slight masking action A concentration twenty times the threshold shows a beginning protection, which increases rather irregularly with further increase in sucrose concentration The highest concentrations of sucrose studied appeared to give somewhat greater masking effects on the strychnine sulphate solution than on the alkaloid and somewhat less on the hydrochloride It is not felt, however, that these differences are necessarily significant The solution of sucrose 100 times its threshold masked 14 to 18 times the threshold of strychnine and its salts

TABLE III —TASTE LIMENS FOR SACCHARIN-STRYCHNINE TESTS

Concentrations as millimols/liter

Saccharin	Strychnine in the Form of Alkaloid	Sulphate	Hydrochloride
0	0 00347	0 00323	0 00323
0 067	0 00333	0 00363	0 00351
0 667	0 00363	0 00400	0 00400
1 333	0 00400	0 00470	
2 000	0 00444	0 00616	0 00533
2 67	0 00500	0 00667	
3 33	0 00533	0 00800	0 00800
4 00	0 00572	0 01000	
5 33	0 00667	0 01600	0 01000
6 67	0 00800	0 02220	0 01600

The detailed findings of the taste limens for strychnine and its salts in saccharin solutions are given in Table III Increasing concentrations of saccharin again proved effective in masking the bitterness of strychnine A marked difference was found, however, in tests upon the alkaloid and upon the salts The 100 fold saccharin solution masked somewhat more than two times the threshold of the alkaloid, but five times the concentration of strychnine as the hydrochloride and seven times the threshold as the sulphate Our previous studies have shown the

"common ion effect" produced by sodium salts (2), although we did not obtain as great an effect as this It is also conceivable that these strong solutions through influences on the osmotic pressure may influence the rates of absorption

Because of the limited solubility of dulcin, it was not possible to obtain so extensive a series of solutions The detailed data are given in Table IV In general, dulcin tends to resemble saccharin, that is, there is an increased masking effect with an increase in dulcin concentration, and the masking action is about twice as great against the salts as against the alkaloid The strongest solution tested, which was twenty times the threshold for dulcin, protected against somewhat less than two times the threshold for the alkaloid and against somewhat more than three times the threshold for strychnine as the sulphate or hydrochloride

TABLE IV—TASTE LIMENS FOR DULCIN STRYCHNINE TESTS

Concentrations as millimols/liter

Dulcin	Strychnine in the Form of Alkaloid	Sulphate	Hydrochloride
0	0 00347	0 00323	0 00323
0 10	0 00333	0 00348	0 00348
1 00	0 00363	0 00421	0 00470
2 00	0 00572	0 01000	0 01000

TABLE V—MASKING POWER OF SWEETENING AGENTS AGAINST STRYCHNINE

Gm required to mask 1 Gm of strychnine

Threshold Concentration of Strychnine	Saccharin Strychnine as Alkaloid	Sulphate	Dulcin Strychnine as Alkaloid	Sulphate	Sucrose Strychnine as Alkaloid	Sulphate.
1	14 3	13 2	16 1	15 5	6 790	6,790
10	131	120	147 5	128 5	62,350	63,400
20	240	204	188	188	79,100	90,500
30	326	234			74 000	110,050
40	382	290			79 600	79,500
50	452	260			57,000	57,000
60	502	288			40 700	54,400
80	578	240			54,350	50,000
100	522	216			45,500	39,800

For the practical application of these results, Table V has been prepared to show the number of grams of each sweetening agent required to mask the bitter taste of one Gm of strychnine as alkaloid or as sulphate in various multiples of the threshold bitter taste For example, the threshold concentration of strychnine having a bitter taste is 5 8 gamma per 5 cc , or 1 16 mg per liter If 1 Gm of strychnine is dissolved in 862 liters of water to give a concentration of 1 16 mg per liter (the threshold concentration recorded in Table V) it would be necessary to dissolve in this solution 14 3 Gm of saccharin, 16 1 Gm of dulcin or 6790 Gm of sucrose to mask its bitter taste As the concentration of strychnine is increased, the sweetening agents become relatively more effective Saccharin appears to be the most efficient of these sweetening agents, but tremendous amounts are required for masking purposes

As the concentration of strychnine in a sweetening agent was increased, loss in sweetness developed before any bitter taste could be detected This was particularly noticed with strong concentrations When solutions of sucrose fifty times the

threshold, or stronger, were mixed with strychnine in any form, marked nausea was noted by one of us This was observed even though the solution was almost tasteless from neutralization of the sweet and bitter tastes When strychnine in any form was mixed with solutions of saccharin or of dulcin at concentrations fifty times their sweetness threshold or above, a peculiar metallic flavor resembling dental amalgam was observed

Variation of individuals in speed of bitterness perception was again confirmed. One of us was able to identify the bitter taste of strychnine at a given concentration in two to ten seconds, another required fifteen to twenty seconds The opposite condition prevailed for detecting sweet tastes, the "bitter-slow" being "sweet fast" These differences in rate of apperception were not associated with any marked variation in absolute threshold taste limen, which is in accord with our previous findings (2)

CONCLUSIONS

1 Sucrose, saccharin and dulcin mask the bitter taste of strychnine as the alkaloid, sulphate or hydrochloride

2 Sucrose masks the bitterness of the alkaloid and the salts to about the same extent, a concentration one hundred times its sweetness threshold masking fourteen to eighteen times the strychnine threshold

3 A solution of saccharin one hundred times its threshold masks somewhat more than two times the threshold of the alkaloid, and five to seven times the thresholds of the salts

4 A solution of dulcin twenty times its threshold masks somewhat less than two times the threshold of strychnine alkaloid, and somewhat more than three times the thresholds of the salts

5 Increasing concentrations of sweetening agents increased their masking effects

BIBLIOGRAPHY

(1) Justus C Ward and James C Munch Studies on Strychnine (1) The Relative Sensitivity of Certain Chemical and Physiological Tests," Jour A Ph A 19 (1930), 954–957

(2) Justus C Ward and James C Munch, ' Studies on Strychnine (2) The Action of Certain Substances in Masking the Taste of Strychnine " *Ibid* , 19 (1930), 1057–1060

(3) James C Munch, 'Bioassays A Handbook of Quantitative Pharmacology" Williams and Wilkins (1930), 145

PHARMACOLOGICAL AND CHEMICAL STUDIES OF THE DIGITALIS GROUP I ADONIS, APOCYNUM AND CONVALLARIA *

BY JAMES C MUNCH[1] AND JOHN C KRANTZ, JR [2]

Although a very large number of papers have been published dealing with various phases of studies conducted upon digitalis, no systematized and concerted investigation of the pharmacology and chemistry of other members of the digitalis

* Preliminary reports at Miami meeting, 1931, and Washington meeting, 1934

[1] Sharp and Dohme, Glen Olden, Penna

[2] Maryland Department of Health, Baltimore, Md

(Foot-note We wish to express our appreciation of the assistance rendered by Arnold Quici, Sharp and Dohme, in making many of the bioassays in this study, and to Mrs Margarethe Oakley, Maryland Department of Health, for assistance in the chemical assays)

group has been found in the literature In this investigation, studies were collaboratively conducted upon adonis, apocynum and convallaria The control products used for these studies were prepared from crude drugs identified by competent pharmacognosists The bioassay records of two drug manufacturers over a period of some twenty years have been consulted to ascertain the variations in potency of these crude drugs, as offered in commerce It should be appreciated that these examinations were made voluntarily, before the bioassay requirements of the U S P or N F were made effective In some instances tests were made upon the crude drug only other samples were reassayed from time to time, to obtain some information on rates of deterioration Samples of the finished products marketed as tinctures or fluidextracts by various manufacturers were collected and tested Since no official standards have been prescribed for these products, it was thought of interest to determine the variation in potency of marketed products It appears that at least some of the drug manufacturers have been voluntarily assaying and standardizing these preparations, even in the absence of official potency requirements In addition, a detailed search of the literature has been made to learn the potency of such products as reported, even though the authenticity of the test product is not known In this communication, our results are presented upon adonis, apocynum and convallaria, and certain active principles obtained from these drugs

Clinical reports state that adonis, apocynum and convallaria resemble digitalis in many particulars in their effects upon the heart Prescription surveys show that prescriptions are still being written for these products, although their use in the United States is much smaller than is the use of digitalis Adonis has obtained a definite vogue in Russia, not only as a drug for exerting certain effects upon the heart, but also as a diuretic (4, 5, 9, 10, 15, 16, 17, 18, 22, 25, 29, 30, 32) A glucoside, adonidin, was extracted from adonis and clinical reports have suggested its value Mercier and Mercier (25), in a detailed study of adonis, separated two glucosides, (1) adonidoside, which is water soluble, and (2) adonivernoside, which is insoluble in water, but soluble in chloroform Adonidoside was found to be more cardiotropic and myotropic, having only a feeble action on the central nervous system, adonivernoside was a marked diuretic

Over a hundred years ago it was reported that apocynum was an emetic, cathartic, diaphoretic and diuretic Pharmacological and clinical studies showed that it had a specific effect upon the heart, resembling that of digitalis and that a glucoside, cymarin, extracted from apocynum had a similar activity Because of its action as a diuretic, it has been called the "vegetable trocar" (30, 32) Some information in the literature suggested that there were differences in the activity of different species of apocynum We have made tests on a number of samples of *Apocynum cannabinum* and of *Apocynum androsæmifolium* which were identified, root by root, by Professor William J Stoneback for us We found that fluidextracts prepared from each species showed precisely the same physiological activity If cymarin is the active principle, as has been suggested, this would be expected in view of Cushny's report (5) that cymarin is identical whether extracted from *A cannabinum*, *A androsæmifolium* and *A venetum*

Studies on convallaria have shown that the flowers are richer in active principles than are the roots Karrer (21) in a series of chemical studies supplementing

the earlier investigations of convallaria, (11, 16, 18, 20, 23, 24, 35) has obtained a crystalline glucoside, convallatoxin, which is somewhat less than twice as toxic for frogs as is ouabain

Review of the literature on adonis showed that tests have been made upon frogs, guinea pigs, rabbits and cats, in Table I results reported in the original articles have been recalculated in terms of milligrams of crude drug or of active principle per kilo of body weight of animal This permits immediate comparison of the potency of any extractive in terms of the crude drug The bioassays which we have made are recorded in Table II Studies of deterioration have been rather limited results obtained in our one-hour frog study and in the study by the cat method reported in the literature are given in Table III The chemical assay of the sample of fluidextract of adonis tested by the one-hour frog method in Table III was made by a modification of the Knudson-Dresbach method (1, 26) It was found chemically to be 104 per cent of the (chemical) potency of a standard digitalis product simultaneously assayed by the one-hour frog method and found to be in harmony with the U S P X potency requirement This result is in good agree ment with that obtained by the one-hour frog method which showed the product to be 600/550, or 109 per cent of the requirement of the U S P X for digitalis It is suggested that, if adonis and its preparations are recognized in the forthcoming revision of the National Formulary, the one-hour frog method should be recom mended for bioassay, and that the same potency requirement be established for adonis and its preparations as for digitalis and the corresponding digitalis prepara tions In other words, adonis, by bioassay, has the same activity as digitalis

Physiological potencies of apocynum preparations found in the literature are recalculated in terms of milligrams per kilo and given in Table IV Holste (18) found by perfusion of the isolated frog heart that 0 24 mg of cymarin was equivalent to 1 mg of ouabain other reports in the literature, using the same technique (26) give values of 0 85, 3 54 and 5 38 mg of cymarin as equivalent to 1 mg of ouabain The purity of the cymarin used is unknown In testing tincture of apocynum by the pigeon emesis method, Hanzlik (13) found that a dose equivalent to 9 mg of crude drug per kilo produced emesis and 20 mg per kilo produced death Baljet's studies (1) by the Gottlieb thirty-minute frog method (26) showed that the M S D of cymarin was 0 12 mg per kilo, and of ouabain 0 03 mg per kilo Two fluid extracts of apocynum were assayed simultaneously by the one-hour frog and the M L D cat method For Sample A, the M S D was 320 mg per kilo, the M L D cat value 55 mg per kilo For Sample B, the M S D frog value was 280 mg per kilo, the M L D cat value, 23 mg per kilo Our results in assaying fluid-extract of apocynum by the frog and guinea pig methods are given in Table V The fluidextracts to which letters were arbitrarily signed are products purchased on the open market, and these fluidextracts A and B are not those just referred to Three fluidextracts were reassayed by the frog and guinea pig methods from time to time over 172 weeks to follow any deterioration One sample by both methods of assay showed an apparent increase in potency, but reassays were not made on these samples subsequently to learn whether these changes were apparent or real The loss by the guinea pig method appeared to be greater than by the one hour frog method which showed comparatively little change The chemical assay showed this fluidextract to be 111 per cent of the potency of a similar digitalis

product, although the bioassays showed this product to be approximately twice the potency of the digitalis product It is suggested that, if apocynum and its preparations are recognized in the forthcoming revision in the National Formulary no difference be made between various species, and that the one-hour frog method should be recommended for bioassay, and that the potency requirement established for apocynum and its preparations require them to have twice the strength of digitalis and the corresponding digitalis preparations In other words, apocynum, by bioassay, should have twice the activity of digitalis

Reports in the literature regarding the physiological potency of convallaria preparations are given in Table VII Our studies on fluidextracts, are given in Table VIII and on deterioration in Table IX The four samples studied by the one-hour frog method showed comparatively little deterioration over a period up to 153 weeks Chemical assays of a fluidextract which was somewhat more than 300 per cent of the U S P requirement for digitalis by the one-hour frog method showed only 70 per cent of the estimated potency It is suggested that, if convallaria and its preparations are recognized in the forthcoming edition of the National Formulary, the one-hour frog method should be recommended for bioassay and the convallaria products should be three times as potent as the corresponding digitalis preparations In other words, convallaria, by bioassay, should be three times as powerful as digitalis

For ready reference, results of the bioassay and chemical assay, as well as the p_H of samples tested by the Wilson hydrogen electrode method are given in Table X

TABLES

TABLE I —REPORTED PHYSIOLOGICAL POTENCY OF ADONIS PREPARATIONS

All data recalculated to mg /Kg

		Method of Assay				
		Frog		Guinea Pig	Rabbit	Cat
Ref	Product.	M S D 1 Hr	M L D	M L D Subcu.	M L D I V	M L D I V
8	Fluidextract	400				
17	Fluidextract	450				
29	Fluidextract	360–430		600		
2	Fluidextract	460	3600			
31	Fluidextract	450				
7	Fluidextract					100
15	Fluidextract					100–140
8	Adonidin	4				
4	Adonidin		3		1	
10	Adonidin		38		4 6	
7	Adonidin					4 34
14	Adonidin					3 0
16	Adonidoside		3		2 5	
9	Adonidoside		2 5			0 7
25	Adonidoside		2 5	3 5	1 0	
22	Adonidoside		3 3			4 7
16	Adonivernoside		3 7		2 0	
9	Adonivernoside		5 9			1 3
25	Adonivernoside		6 0	6 0	2 0	2 2
22	Adonivernoside		4 5		0 19	2 3

TABLE II —BIOASSAYS OF ADONIS PREPARATIONS

All data recalculated to mg /Kg

Product	Sample Number	Frog M S D 1 Hr	Guinea Pig M L D Subcu
Crude drug	1	420	480
Fluidextract	2	625	800
Fluidextract	3	610	
Adonidin	4	5	5 4

TABLE III —DETERIORATION OF ADONIS PREPARATIONS

All data recalculated to mg /Kg

Assay Method	Original Potency	Reassay Age Wks	Reassay Potency	Loss in Activity Per Cent.
M S D 1-hr frog	*420*	*166*	*550*	*24*
M L D Cat*	57	36	88	35
M L D Cat*	188	36	262	28

* Product stored was tincture in 70 per cent alcohol (15)

TABLE IV —REPORTED PHYSIOLOGICAL POTENCY OF APOCYNUM PREPARATIONS

All data recalculated to mg /Kg

Ref	Product	Method of Assay: Frog M S D 1 Hr	Frog M L D	Guinea Pig M L D Subcu	Rabbit M L D I V	Cat M L D I V
8	Fluidextract	120				
27	Fluidextract			240		
12	Fluidextract			300		
7	Fluidextract					66
13	Fluidextract					70
20	Cymarin					0 1
26	Cymarin		0 7			0 125
32	Cymarin		0 8*			
			2 0[1]			
21	Cymarin		0 67			

* *Rana temporaria*

[1] *Rana esculenta*

TABLE V —BIOASSAYS OF APOCYNUM PREPRATIONS

All data recalculated to mg /Kg

Product	Sample Number	Frog M S D 1 hr	Guinea Pig M L D Subcu.
Fluidextract	1	320	
Fluidextract	2	280	
Fluidextract	3		160
Fluidextract	4		220
Fluidextract	3		240
Fluidextract	6		400
Fluidextract	7		340
Fluidextract	8	320	
Fluidextract	9	390	
Fluidextract	10		260
Fluidextract	11	250	180
Fluidextract	12	250	180

Fluidextract	13	280	250
Fluidextract	14	220	200
Fluidextract	15		250
Fluidextract	A		240
Fluidextract	B		320
Fluidextract	C	280	180
Fluidextract	D	250	200
Fluidextract	E	280	190

TABLE VI —DETERIORATION OF APOCYNUM PREPARATIONS

All data recalculated to mg /Kg

Assay Method	Original Potency	Reassay Age Weeks	Reassay Potency	Loss in Activity Per Cent.
1 hour frog	250	156	280	11
		172	260	4
1-hour frog	280	16	220	(27)
1-hour frog	220	16	230	4
M L D Guinea Pig	160	76	480	67
M L D Guinea Pig	220	4	180	(22)
M L D Guinea Pig	240	106	400	40
		108	430	30

TABLE VII —REPORTED PHYSIOLOGICAL POTENCY OF CONVALLARIA PREPARATIONS

All data recalculated to mg /Kg

Ref	Product	Method of Assay: Frog M S D 1 Hr	Frog M L D	Guinea Pig M L D Subcu	Rabbit M L D I V	Cat M L D I V
11	F E Root		167			
35	F E Root		200–250			
28	F E Root		30*	60		
			50–90[1]			
3	F E Root		40–70		30–70	
19	F E Root		250			
34	F E Root		210			
8	F E Root	200				
27	F E Root			300		
12	F E Root			300		2–50
26	F E Root					
11	F E Herb		107			
21	F E Herb		100			
35	F E Herb		150–330			
19	F E Herb	110–220	100–240			
8	F E Herb	187				
11	F E Flowers		80			
11	F E Flowers (Freshly dried)		50			
11	F E Flowers (5 yrs old)		90			
21	F E Flowers		55			
35	F E Flowers		100			
19	F E Flowers		90			
8	F E Flowers	75				

TABLE VII —*Continued*

21	Convallamarin		10		
35	Convallamarin		15		
23	Convallamarin	0 3–0 6			
8	Convallamarin	4 5			
6	Convallamarin	4 75			
24	Convallamarin			3–4	
7	Convallamarin				1 68
21	Convallatoxin		0 33		

* *Rana temporaria*

[1] *Rana esculenta*

TABLE VIII —BIOASSAYS OF CONVALLARIA PREPARATIONS

All data recalculated to mg /Kg

Product.	Sample Number	Frog M S D 1 Hr	Guinea Pig M L D Subcu
Fluidextract	1		140
Fluidextract	2	220	
Fluidextract	3	200	
Fluidextract	4	200	
Fluidextract	5		300
Fluidextract	6		280
Fluidextract	7		300
Fluidextract	8		320
Fluidextract	9		240
Fluidextract	10		120
Fluidextract	11		160
Fluidextract	12	110	
Fluidextract	13	150	
Fluidextract	14		180
Fluidextract	15	180	
Fluidextract	16	150	100
Fluidextract	17	140	100
Fluidextract	18	180	80
Fluidextract	19	170	
Fluidextract	20	250	260
Fluidextract	21	200	120
Fluidextract	22	195	
Fluidextract	A	167	160
Fluidextract	B	125	80

TABLE IX —DETERIORATION OF CONVALLARIA PREPARATIONS

All data recalculated to mg /Kg

Assay Method	Original Potency	Reassay Age Wks	Reassay Potency	Loss in Activity Per Cent
1-hour frog	175	136	190	9
		152	180	3
1-hour frog	180	1	175	(3)
		137	175	(3)
		153	220	18
1-hour frog	170	28	200	15
		36	200	15
1-hour frog	200	72	170	(18)
		100	200	0
		116	220	9

TABLE X —COMPARISON OF PHARMACOLOGICAL AND CHEMICAL ASSAYS

Product	Potency as Per Cent U S P Tr Digitalis 1 Hour Frog	Chemical	P_H
Standard Tr Digitalis	100	100	
Tr Adonis	109	104	5 99
Tr Apocynum	230	111	5 13
Tr Convallaria	300	70	5 96
Ouabain			
53 gamma/cc	65	81	
82 gamma/cc	100	125	

CONCLUSIONS

1 Adonis and its preparations bioassayed by the one-hour frog method should have the same potency as digitalis and the corresponding digitalis preparations

2 Apocynum should have twice the potency of digitalis by the one-hour frog method of assay

3 Convallaria should be three times as potent as digitalis by the one-hour frog method of assay

BIBLIOGRAPHY

(1) H Baljet, 'Les Glucosides Digitaliques, une Nouvelle Reaction d'Identite," *Pharm Schweiz Apoth Zeit* 56 (1918) 71–74, 84–88

(2) M Brot, "Influence de la Chaleur sur les Preparations de Digitale et d'Adonis Vernalis," *Rev med suisse romande*, 43 (1923), 350–358

(3) C Buhrer, "Untersuchungen uber die Wirksamkeit Einiger Toxicher Fluidextrakte der Pharm Helv III " *Inaug diss Basel* (1900)

(4) V Cervello "Adonis Vernalis Extraction and Characters of Active Principle " *A E P P*, 15 (1883) 235 PROC A PH A 31 (1883) 140

(5) A R Cushny, ' The Action and Uses in Medicine of Digitalis and Its Allies " 1925

(6) C W Edmunds and W Hale, The Physiological Standardization of Digitalis," *Hyg lab bull*, No 48 (1908)

(7) C Eggleston, ' Biological Standardization of the Digitalis Bodies by the Cat Method of Hatcher," *A J P*, 85 (1913) 99–122

(8) L W Famulener and A B Lyons, ' Relative Strength of Various Preparations of Digitalis and Kindred Drugs as Shown by Experiments on Frogs," PROC A PH A, 50 (1902), 415–425 *Pharm Arch* 5 (1902), 101–111

(9) K Fromherz, "Herzwirksame Glykoside von Adonis Vernalis," *Münch med wochschr*, 75 (1928), 818–820

(10) J M Fuckelmann, "Constituents and Actions of Adonis Vernalis," *Sitzber Abhandl naturforsch Ges Rostock* (1911) 31, *C A* 6, 2671

(11) M Gatty-Kostyal, "Convallaria Majalis," *Bull sci pharm*, 36 (1929), 469–471

(12) T S Githens and C E Vanderkleed Physiologic Standardization on Cardiac Stimulants and Depressants, together with a Comparison of Such Standardization with Some Results Obtained by Chemical Assay ' PROC A PH A, 58 (1910), 913–924

(13) P J Hanzlik, "A New Method of Estimating the Potency of Digitalis Pigeon Emesis," *J P E T*, 35 (1919) 363–391

(14) R A Hatcher and J G Brody,"The Biological Standardization of Drugs,"*A J P*, 82 (1910) 360–372

(15) R A Hatcher and H B Haag "A Contribution to the Pharmacology of Adonis Vernalis," *J P E T*, 47 (1933) 217–232

(16) P Hauptstein "Vergleichende Untersuchung der Wirksamkeit Herzspezifischer Glykoside Zweiter Ordnung," *A E P P*, 126 (1927) 121–128

(17) F W Heyl, M C Hart and J M Schmidt, "Examination of the Leaves of Adonis Vernalis," *J A C S*, 40 (1918), 436–453

(18) A Holste, "Zur Wertbestimmung von Herzmitteln," *Zeit exp path ther*, 15 (1914), 385–408

(19) E M Houghton, Proposed International Standard for the Physiological Assay of the Heart Tonics of the Digitalis Series," *Lancet* I (June 19 1909)

(20) Jacobsohn, *Inaug diss Dorpat* (1892) Through Reference No 5

(21) W Karrer, "Darstellung Eines Krystallisierten Herzwirksamen Glykosides aus Convallaria Majalis, L ," *Helv Chim Acta*, 12 (1929) 506–511

(22) H Lohr, "Treatment of Heart Disease with Adonis Vernalis," *Zeit ges exptl Med*, 60 (1928), 368–384, through *Ber ges Physiol*, 48 (1929), 142

(23) Marme, ' Chemistry of Convallaria," *Gottinger Nachr* (1867)

(24) E Maurel, "Influence des Principales Voies d'Administration sur les Doses Minima Mortelles de Convallamarine pour la Grenouille, le Pigeon et la Lapin," *Compt rend soc biol*, 62 (1907), 1036–1038

(25) L J Mercier and F Mercier "L'Adonis Vernalis Étude Chimique et Pharmaco dynamique," *Rev Pharmacol ther exp* 1 (1927) 1–73

(26) J C Munch, "Bioassays" (1931)

(27) P S Pittenger, "A Text-Book of Biologic Assays," 2nd Edition (1928)

(28) J L Prevost, "Nouveaux Essais Pharmacologiques sur Quelques Preparations de la Pharmacopée Helvetique, Ed III," *Rev med suisse romande*, 15 (1895), 453–469

(29) J M Schmidt "The Pharmacological Action of Adonis Vernalis," *A J P*, 92 (1920), 702–714

(30) T Sollmann ' Manual of Pharmacology " 4th Edition (1932)

(31) O Stepphuhn and G Pewsner, 'Uber die Extraktionsbedingungen von Adonis Vernalis," *A E P P*, 105 (1925) 334–342

(32) W Straub, "Die Digitalisgruppe " In "Heffter's Handbuch der Experimentellen Pharmakologie " 2 (1924), 1355–1452

(33) F Uhlmann, "Uber Eine Neue Wertbestimmungsmethode für Digitalispreparate " *A E P P*, 122 (1927), 219–227

(34) W Wiechowski, "Die Verordnung der Digitalisblatter," *Med klin*, 21 (1925), 1033–1038

(35) S G Zondek 'Pharmacological Estimation of Convallaria Majalis " *A E P P*, 90 (1921), 277–287 *C A*, 16, 613

SOME CONSIDERATIONS OF SILVER PICRATE *

BY JOHN C BIRD AND ALFRED BAROL

This presentation is intended to cover some of the outstanding points evolved during recent work with silver picrate, certain particular merits of which would seem to have hitherto been overlooked It is hoped that some of the promising results reported here will act as a stimulus to further clinical investigation of this product

A survey of the literature covering the last 100 years is disappointing in the scarcity of data concerning silver picrate The compound was first produced as a by-product by Chevreul, in 1809, during his work on indigo and later by Liebig in 1828, who named it "silver carbazotate," and noted its explosive property To Dumas (1) however, might be ascribed the credit of first preparing silver picrate, as such, from silver nitrate and ammonium picrate, in 1841 Dumas published an analysis of the compound and evidently stimulated further work, for both Lau

* Scientific Section, A PH A , Washington meeting, 1934

rent (2) and Marchand (3) entered the field within the next three years, making silver picrate from silver carbonate and picric acid Nothing further was done until Carey Lea (4), working in Philadelphia in 1858, prepared the chemical by interaction of silver nitrate and magnesium picrate and briefly described it and such of its properties as were then known, before the Society for the Advancement of Science

There appears to be no further reference to silver picrate until 1905, when it is referred to in the literature of the time as being a new medicament of use in certain conditions of urethritis, vaginitis, etc , while Yale (5) claimed good results in the treatment of diphtheria It was supplied for some time to the medical profession and exhibited in a gelatin or petrolatum base in the form of suppositories and ointments It is due to numerous reports of its peculiar efficacy in these and allied conditions that our recent work has been stimulated

The preparation of silver picrate according to the old and standard methods, such as the action of picric acid upon silver oxide or carbonate in aqueous suspension, has several disadvantages, mainly because of the low solubility of silver picrate in water, about one per cent at ordinary temperature This necessitates the use of large volumes of liquid with consequent lengthy filtrations, evaporations, etc , in capacious tanks of special construction, if a satisfactory product is to be obtained The solubility is somewhat higher (about 5%) in hot water, but application of heat is not desirable

In a search for a solvent for silver picrate which would facilitate its preparation, most of the usual, and many unusual solvents were tried with but little encouragement, the maximum solubility being in most cases below one per cent It is remarkable, therefore, to find that certain of the glycol ethers (particularly diethylene glycol monoethyl ether) possess remarkable solvent powers for this otherwise comparatively insoluble silver salt We have by its means been able to prepare non-viscous solutions of silver picrate containing up to 40% of the solid which, while serving as a means of manipulation, may also be used directly as medicaments In our new method of preparation use is made of this property of abnormal solubility, by carrying out the reaction in the glycol ether Silver oxide is freshly precipitated in the usual way, washed, drained and pressed free from excessive moisture It is then mixed thoroughly in a glass or enameled vessel with a sufficient quantity of the glycol ether to form a smooth paste Picric acid is added in the stoichiometric proportion, when reaction takes place almost immediately and silver picrate is formed On final warming to about 80° C the liquid becomes practically clear, and is filtered when neutral to litmus The bright golden liquid thus forms a concentrated solution of silver picrate, usually precalculated to give a concentration of about $33^1/_3$% of the solid It may be used directly for the preparation of medicinal and pharmaceutical products or to prepare the solid in crystalline form This operation consists in merely adding water to the concentrate and is the reverse of that usually employed in the preparation of crystalline substances, whereby water is gradually removed by evaporation In this case by pouring the warmed glycol solution into about twice its volume of water, large and beautiful golden-yellow needles of silver picrate separate rapidly These are drained, washed with ice water and air-dried with minimum exposure to light

CHEMICAL AND PHYSICAL PROPERTIES

Silver picrate thus obtained forms fine golden-yellow needles of intense coloring power, odorless, but possessing a penetrating bitter taste, the dust is somewhat irritating to nasal membrane The bitterness and staining power are, however, much modified in solutions of the strength used in medications The crystals usually separate with one molecule of water of crystallization but may, on occasion, be anhydrous The substance contains about 30% of silver and is soluble, 1 part in 113 of water at room temperature, solubility at temperatures around 90° C rises to about 5% Boiling water or prolonged exposure of aqueous solutions to light result in gradual decomposition with separation of silver oxide, as is the case with many silver salts The yellow color of the solutions, however, is some aid toward stability to light, colloidal silver chloride, for example, remains suspended in a solution of silver picrate without discoloration for many days, even in bright light. The solid detonates mildly on rapid heating, but it is not as violent, for example, as the sodium, potassium, ammonium or calcium salts Silver picrate forms a well-defined compound with ammonia, first noted by Carey Lea (6) in 1861 By gradually adding ammonia solution to the glycol ether concentrate, no precipitation of silver oxide is formed, as might be expected The solution turns deep orange and eventually precipitates long, thick, dark yellow needles of a compound which on analysis is shown to contain $2NH_3$ per molecule of silver salt This substance possesses interesting properties which are still under investigation It is not as stable as silver picrate, nor is it as soluble in water and other solvents The solutions rapidly darken with separation of silver oxide or silver and the slightest application of heat causes the deposition of a shining silver mirror on containing vessels If increase in bactericidal efficiency and therapeutic activity can be associated with this tendency to decomposition under ordinary circumstances, silver ammonio picrate should possess some interesting possibilities in therapeutic application

The high solubility of silver picrate in the glycol ethers renders possible, in a simple and rapid manner, the formation of numerous ethers of picric acid The required alkyl or aryl halide, such as ethyl iodide, phenyl chloride, etc , is merely dissolved in the same glycol solvent and added to the silver picrate solution Silver halide is at once precipitated in the cold, practically quantitatively, leaving the required picric ether in solution After filtering, water may be added to the liquid as previously described to produce fine crystals of the picric acid derivative In this way methyl, ethyl, phenyl and benzyl picric ethers have been prepared with rapidity and ease The method is not limited to organic derivatives, for metallic compounds may also be similarly produced Mercuric chloride, for example, being soluble in the glycol ether, may be used to prepare mercuric compounds It is hoped that this method may be extended to cover the preparation of other promising derivatives which are not readily obtained by the usual procedures

PHARMACOLOGY AND BACTERIOLOGY

From the pharmacologic and therapeutic standpoints silver picrate combines the effects of silver and of picric acid It may be said to occupy an intermediate position having silver nitrate, with its caustic and irritating, but strongly germicidal properties on the one hand, and the non-irritating, mild, perhaps doubtfully germici-

dal, so-called colloidal silver preparations on the other Silver picrate retains the medicinal qualities of the silver ion but possesses in addition, the well-known analgesic, healing and antiseptic properties of picric acid Much of the bactericidal power is due to the silver which, although ionized in solution to a less extent than silver nitrate, makes silver picrate more efficient bactericidally than the colloidal silver or protein-masked products The therapeutic properties of picric acid are well known, it having been used with success for many years in various skin lesions, including eczema, intertrigo, body ringworm, etc , Wilson (7) stating that in these particular complaints picric acid treatment gave results far superior to any other materials he had used Kolmer (8) found that the use of picric acid as an application to the skin after vaccination proved four times more efficient than phenol in lessening the degree of local inflammatory action

As an astringent, picric acid has been found superior to zinc sulphate or alum, while its penetrating powers are considerable, as shown by the fact that the hands are stained by the solution even through rubber gloves Its use in burns and ulcers is well known, Muncy (9) stating that he had "failed to find an ulceration which did not respond to picric acid," while its "marked anodyne properties (when applied to wounds) made the use of aspirin or morphine rare "

In ophthalmic work, picric acid has met with approval, having been found "far superior in antiseptic action, in the strengths used, to other antiseptics usually administered in ophthalmology " Ehrenfried's (10) summation of the desirable therapeutic qualities of picric acid states the case particularly well

> "Over any clean denuded surface it forms a protective aseptic scab by coagulation of secreted serum which seals up ruptured lymph spaces, protects exposed nerve endings and splints the wound in such a manner that epithelial proliferation may proceed rapidly beneath stimulating nature's method This artificial scab protects against infection from external sources and promotes rapid and painless epidermatization "

If any corroboration of the above is required, Broon (11) reporting on results of picric acid in war surgery states

> "One per cent picric acid is recommended for dressing superficial wounds, syringing sinuses, fractures and corroded tissues It kills bacteria without corrosive effect and prevents suppuration, stimulates granulation of tissue, has marked anodyne properties and is less irritating and more efficacious than iodine It may be used for sterilization of the skin in surgical cases and shortens the convalescent period "

In February of this year Stewart (12) reported his investigations into the maggot treatment of osteomyelitis, showing that a mixture of calcium carbonate and picric acid, or calcium picrate had practically the same effect as the maggots in stimulating phagocytosis and healing the wound In the light of these and many other gratifying reports on the desirability and efficacy of picric acid, it would seem that silver picrate should be worthy of even greater consideration under similar circumstances The additive effects of silver and picric acid would seem to be particularly desirable, as the action of the two constituents is apparently synergistic The liberation of picric acid or picrates by interaction with tissue fluids should be preferable to the corrosive or caustic results of silver nitrate, particularly as the picrate radical would appear to exert such beneficial side effects The irritating effects of silver picrate solutions in the concentrations normally used are insignifi-

cant, for in the course of this work silver picrate solutions of strength 1 1000 have been instilled into the eyes of dogs, cats and guinea pigs thrice daily for ten days and more without sign of irritation or deleterious effect The solutions are less injurious than silver nitrate and definitely of greater efficacy and more rapid action than colloidal silver products Baum (13) in testing a series of silver preparations including argyrol, protargol and silver picrate in several cases of gonorrhea, found that 1/4 to 1 1/2% solutions of the picrate were as effective as 2 to 10% of some of the colloidal silver preparations in stopping the discharges present By agar plate tests using typhosus, aureus, diphtheriæ and gonococcus organisms silver picrate was found to be the equal of similar strengths of silver nitrate in all cases but one (*C diphtheriæ*) *Trichomonas Vaginalis*—the organism frequently found in cases of leucorrhea—is killed instantly by 1% silver picrate solutions, and pus cells are immediately coagulated In short, silver picrate would appear to possess germicidal properties both physical and chemical in nature, picric acid apparently acting by precipitation of albuminous matter, and in some way denaturing the cell constituents These effects, together with its powerfully penetrative properties, probably render the field more suitable for the subsequent action of the silver ion

CLINICAL APPLICATIONS

Silver picrate should be capable of application over a considerable therapeutic field, although with the exception of the recent work of Vanstane (14) who applied it successfully in *otitis media*, vaginitis, cervicitis, and diseases of the bladder, rectum and colon, its existence and usefulness appear to have been overlooked The reason for this may possibly be accounted for by the number of reported fatalities among factory workers during the war period, resulting in the undeservedly restricted use of picric acid compounds

The thought is therefore presented that, in the light of the above findings in which the combination of silver and picric acid has proved equal or superior to the usual silver medicaments without some of their disadvantages, this chemical should be worthy of recognition in medical and pharmaceutical armamentaria

REFERENCES

(1) Dumas *J prakt Chem*, 24 (1841) 193
(2) Laurent, *Ann chim* (3) (1841) 226
(3) Marchand, *J prakt Chem* (1), 32 (1844), 42
(4) Carey Lea *Silliman s J* 2nd Ser 26 (1858) 379
(5) Yale ' Therapeutics Materia Medica and Pharmacy " 11th Ed page 368 Potter
(6) Carey Lea *Am J Science and Arts*, 31 (1861), 80
(7) Wilson, *Arch Pediatrics*, 30 (1913), 854
(8) Kolmer *Lancet* (Nov 18 1911), 1377
(9) Muncy *J Am Inst Homeopathy* 10 (1918) 1017
(10) Ehrenfried, *J A M A*, 56 (1), (1911) 412
(11) Broon *J Royal Army Med Corps* 28 (1917) 722
(12) Stewart, *Surg Gynecol Obstet* 58 (1934) 155
(13) Baum, *J A M A* (Oct 29 1904), 1340
(14) Vanstane *Illinois Med J* 63 (2), (1933) 168

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

APPARATUS AND MANIPULATIONS

Husa, William J , and Magid, Louis
Drug extraction I A study of various menstrua from the standpoint of swelling effects, penetration and extraction
JOUR A PH A , 23 (1934), 891

PHARMACOPŒIAS AND FORMULARIES

Parry, Ernest J
Resins and resinous bodies of the Swiss Pharmacopœia
Chem & Drug , 121 (1934), 283

PHARMACEUTICAL PREPARATIONS

Back, S
Colours for pharmaceutical and food products
Pharm J , 133 (1934) 287
Downs, C R
Malic acid in effervescent preparations
Pharm J , 133 (1934) 245
Fantus, Bernard Dymewicz, H A and J M
A study of vehicles for medicines
JOUR A PH A , 23 (1934), 915
Hochstetter, Kurt
Codliver oil emulsions
Pharm Ztg , 79 (1934), 956
Jensen, Vilh and Orner Holger
Investigation of the new substances used for the conservation of medicines II
Dansk Tids Farm , 8 (1934) 233
Jermstad, A , and Ostby, O
Studies on the preparation of tinctures
Pharm Acta Helv 9 (1934) 129
Whitney Harvey A K
A method for the preparation of parenteral dextrose solutions
JOUR A PH A 23 (1934) 906

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Beall, Desmond and Marrian
A rapid method for the isolation of œstrone from the urine of pregnant mares
J Soc Chem Ind , 53 (1934) 309T
Dameshek, William, and Castle, William B
Assay of commercial extracts of liver for parenteral use in pernicious anemia
J A M A , 103 (1934), 802
Fabre, Rene and Régnier M -Th
Permeability of the placenta to drugs or toxic substances III Caffeine
J pharm chim , 20 (1934), 193
Koppany, Theodore, and Krop Stephen
Studies on barbiturates VI The elimination of isoamyl ethyl barbituric acid ("Amytal") and *N*-butyl ethyl barbituric acid ("Neonal")
J Pharmacol & Exper Ther , 52 (1934), 87
Martland, H S
Carbon monoxide poisoning
J A M A , 103 (1934), 643
Murphy, William S , and Koppanyi, Theodore
Studies on barbiturates IV Effect of barbiturates in experimental nephrosis
J Pharmacol & Exper Therap 52 (1934) 70
Nunn, J A and Martin F M
Gasoline and kerosene poisoning
Pharm J , 133 (1934), 288
Offerhaus, C , and Baert C G
Anesthetics, particularly cocaine and novocaine Cont.
Pharm Weekbl , 71 (1934), 1050
Rowe, L W , Simond, A , and Nelson W O
The bioassay of the anterior pituitary-like sex hormone (Antuitrin S)
JOUR A PH A , 23 (1934), 882
Swanson, Edward E , and Hargreaves, Chester C
The action of ergot and its alkaloids on the puerperal uteri of dogs
JOUR A PH A 23 (1934), 867
White A C
The pharmacological and toxic action of digoxin
J Pharmacol & Exper Therap , 52 (1934), 1

BOTANY AND PHARMACOGNOSY

Dultz, G
Seeds of Ipecacuanha Nicaragua
Pharm Zentralh 75 (1934), 598

ALKALOIDS AND GLUCOSIDES

OILS, FATS AND WAXES

ANALYTICAL METHODS AND RESULTS

Examination of a sample of Fluidextract of Drosera
Pharm Zentralh, 75 (1934), 595
Kunke, W F
Report on ether
J Assoc Official Agri Chem, 17 (1934), 440
Middleton, A W
A test for ethylene glycol in the presence of glycerin
Pharm J, 133 (1934), 271
Péronnet, Marcel
Determination of benzene in toxicology
J Pharm et Chim, 20 (1934), 145, 195
Phillips, Max
Improved method for determination of percentage acetyl in organic compounds
Ind Eng Chem, 26 (1934), 321
Seifert, R, and Gobel G
Table showing weight-volume relations of some important drugs and chemicals
Pharm Ztg, 79 (1934) 941
Shupe, Irwin S
Report on microchemical methods for synthetics
J Assoc Official Agri Chem 17 (1934), 435
Sinton, Frank C
Report on nitrites in tablets
J Assoc Official Agri Chem, 17 (1934), 462
Wales, H, and Keenan, G L
Note on differentiation between light and heavy magnesium oxide
J Assoc Official Agri Chem 17 (1934) 534
Wales H
Note on the U S P test for "Soluble Alkalies" and alkalinity in milk of magnesia and magnesium oxide
J Assoc Official Agri Chem, 17 (1934), 536
Warren, L E
Report on acetphenetidin in presence of caffeine and aspirin
J Assoc Official Agri Chem, 17 (1934), 466
Woodard, Helen Quincy
Colorimetric determination of iodine by the starch-iodine reaction
Ind Eng Chem, 26 (1934), 331

INORGANIC CHEMICALS

Forner, P, and Lukas H
Solubility of cadmium in some organic acids
Pharm Zentralh, 75 (1934), 557
Schmidt Hebbel, H
Methods for the examination of summer and winter-pressed cottonseed oil
Pharm Zentralh, 75 (1934), 573

ORGANIC CHEMICALS

Foss, Noel E, Dunning, Fitzgerald, and Jenkins, Glenn L
Some unsymmetrical aryl sulphides
J Am Chem Soc, 56 (1934), 1978
Harlay, V
Acid methyl esters of phosphoric acid
J Pharm et Chim, 20 (1934), 160
Moeys G Ph G, and Schoorl N
Properties of "adipoine," a cyclic sugar
Pharm Weekbl, 71 (1934), 1026
Moness, E, and Christiansen, W G
Magnesium salt of tribromethyl sulphuric acid
Jour A Ph A, 23 (1934), 904
Pyman, F L and Stevenson, H A
Phenylmercuric nitrate
Pharm J, 133 (1934), 269
Woollett, G H, and Coulter, V A
The preparation of phenyl mercuric nitrate
J Am Chem Soc, 56 (1934), 1922

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING III SUPPOSITORIES *

BY MARVIN J ANDREWS [1]

INTRODUCTION

This, the third of a series of papers reporting the results of investigations made to determine what may be taken as the permissible margin of error in dispensing,[2] deals with suppositories

Suppositories called for on prescriptions are usually prepared by mixing the active ingredients with the base in the solid state, then dividing and shaping

* Joint Session Scientific Section and Section on Practical Pharmacy and Dispensing, Washington meeting 1934

[1] In collaboration with A G DuMez, Professor of Pharmacy, School of Pharmacy, University of Maryland [2] Jour A Ph A, 22 (1933), 755, 838, 23 (1934) 350 421

the resulting mass by hand, or by mixing the active ingredients with the melted base and pouring the mixture into molds to solidify It is only in rare instances that suppositories are made by machine in the drug store The vehicles commonly employed are cacao butter, glycerinated gelatin or sodium stearate

For the purpose of this study, a typical suppository prescription was selected for compounding, and the suppositories were made by hand Preparation of the suppositories by the other methods mentioned was not attempted as it appeared that these methods offered no additional possibilities for error, except the one due to a variation in the capacity of the individual molds To discover if there was any appreciable variation in the capacities of the molds and to determine the effect of various methods of filling upon capacity, several series of experiments were carried out in which cacao butter alone was used

EXPERIMENTAL PART

The Pharmacopœia of the United States, Tenth Decennial Revision, page 366, gives the following information under suppositories

' For suppositories made with Oil of Theobroma the following general processes may be employed

Take of

The Medicinal Substance, the prescribed quantity
Oil of Theobroma, grated, a sufficient quantity

"Reduce the medicinal substance if dry to a very fine powder, or if an extract soften it with an appropriate liquid, then mix it thoroughly in a mortar with about an equal weight of grated oil of theobroma and incorporate the remainder of the oil of theobroma until a homogeneous, plastic mass is obtained adding if necessary, a small quantity of expressed oil of almond or wool fat Roll the mass on a graduated tile until a cylinder of the proper length is formed divide this into the required number of equal parts, and with a spatula or other mechanical aid, form them into the desired shape

"If the process of fusion is preferred, mix the medicinal substance with about an equal weight of grated oil of theobroma as directed above, then thoroughly incorporate it with the remainder of the oil of theobroma, previously melted by a gentle heat on a water bath in a suitable vessel provided with a lip Allow it to cool to about 38° C , and when the mixture begins to congeal, pour it immediately into suitable well cooled molds Keep the molds at a freezing temperature until the suppositories have hardened and are ready to be removed

"Rectal suppositories should be cone shaped and when made from oil of theobroma should weigh about 2 Gm "

Based on this information three series of tests were made The first series of tests was carried out to determine the variation in weight and length of hand-made suppositories The objective of the second series of tests was to determine the variation in capacities of the suppository molds used in the City of Baltimore in terms of cacao butter The purpose of the third series of tests was to determine the effect, if any, of different methods of filling on the capacity of suppository molds

With the first objective in view, the following prescription was filled, the suppositories being formed by hand

℞ No 1

Ext Bellad	Gm 0 163
Pulv Gall	Gm 1 300
Ol Theobrom *qs*	Gm 20 000

M et ft Supp No 10

In the actual performance of these tests, the suppository prescription was filled by 100 members of the senior class in dispensing pharmacy at the School of Pharmacy of the University of Maryland under working conditions described in the first paper The completed suppositories were checked for accuracy with respect to weight by using a prescription balance, and for accuracy with respect to length by using a millimeter ruler The standard deviation was computed from the results obtained

In tests made to determine the variation in weight of suppositories prepared by hand, the students were instructed to follow the method outlined in the Pharmacopœia In some instances a few drops of expressed oil of sweet almond, castor oil or a few grains of wool fat were added to the grated cacao butter The suppository pipe was rolled and cut on a graduated tile Some were prepared without the use of a dusting powder, while in others lycopodium or filter paper was used in the process of manufacture The students were directed to make the suppositories cone shaped and to make them as near 25 mm in length as possible

The results of this series of tests are presented in Tables I and II

TABLE I —STANDARD DEVIATION IN WEIGHT OF SUPPOSITORIES MADE BY HAND

Batch Number	Av Wt in Gm	S D in Gm	Batch Number	Av Wt in Gm	S D in Gm
1	1 791	0 106	51	1 774	0 151
2	1 946	0 079	52	1 954	0 133
3	2 025	0 401	53	2 130	0 291
4	2 009	0 066	54	2 183	0 064
5	1 713	0 160	55	1 677	0 114
6	1 840	0 189	56	2 047	0 068
7	2 236	0 167	57	1 631	0 318
8	2 049	0 413	58	2 157	0 353
9	1 952	0 045	59	2 015	0 029
10	2 068	0 095	60	1 915	0 143
11	2 117	0 210	61	1 867	0 067
12	1 911	0 063	62	2 054	0 178
13	1 555	0 354	63	2 349	0 314
14	1 710	0 205	64	1 863	0 046
15	1 999	0 182	65	2 094	0 167
16	2 034	0 166	66	1 982	0 092
17	1 934	0 143	67	1 690	0 235
18	2 025	0 095	68	2 046	0 154
19	1 960	0 169	69	2 000	0 418
20	2 044	0 089	70	2 032	0 421
21	1 943	0 124	71	2 351	0 310
22	2 008	0 162	72	2 214	0 273
23	2 010	0 113	73	2 244	0 117
24	2 081	0 279	74	1 984	0 170
25	2 017	0 049	75	1 883	0 097
26	1 765	0 227	76	2 153	0 083
27	1 876	0 071	77	1 939	0 088
28	1 894	0 052	78	1 935	0 071
29	1 721	0 221	79	2 041	0 284
30	1 844	0 128	80	1 850	0 139
31	1 853	0 256	81	1 760	0 157
32	2 193	0 225	82	1 815	0 279
33	2 161	0 258	83	1 845	0 020
34	1 683	0 238	84	1 974	0 179

35	2 071	0 462	85	2 048	0 195
36	1 683	0 252	86	2 036	0 229
37	1 843	0 222	87	2 039	0 133
38	1 959	0 090	88	1 979	0 183
39	1 819	0 134	89	1 638	0 039
40	2 256	0 235	90	1 863	0 067
41	1 905	0 084	91	1 880	0 126
42	2 051	0 085	92	1 860	0 155
43	1 886	0 194	93	1 994	0 126
44	1 962	0 210	94	1 877	0 269
45	1 942	0 189	95	2 008	0 192
46	1 919	0 122	96	1 940	0 214
47	2 064	0 049	97	2 185	0 451
48	1 913	0 065	98	1 926	0 061
49	1 830	0 188	99	1 873	0 093
50	2 176	0 121	100	2 121	0 119
			Average	1 959	0 172

In Table I it will be observed that in the case of the weight of the individual suppositories, the average standard deviation is 0 172 Gm , or 8 81 per cent based on the average weight Fifty-eight of the batches compounded fall within the average standard deviation of 0 172 Gm , thirty-four fall within twice the average standard deviation, or 0 344 Gm , while eight fall within three times the average standard deviation or 0 516 Gm

TABLE II —AVERAGE LENGTH AND AVERAGE STANDARD DEVIATION IN LENGTH OF SUPPOSITORIES MADE BY HAND

Number of Batches of Suppositories Prepared	Average Length of Suppositories Prepared	Average S D in Millimeters.
100	25 76 mm	0 831

In Table II, it will be observed that in the case of the length of the individual suppositories the average standard deviation is 0 831 millimeters, or 3 30 per cent when based on the average length On studying the original results it was noted that fifty-one of the batches compounded fell within the average standard deviation of 0 831 mm , forty-two fell within twice the average standard deviation, or 1 662 mm , while the remaining seven fell within three times the average standard deviation, or 2 493 mm

For the purpose of making it possible to compare the results presented in Tables I and II with similar data that may have been published, but which have not been expressed in terms of the standard deviation, the per cent of deviation from the theoretical has been calculated and is given in Tables III and IV

TABLE III —PERCENTAGE DEVIATION OF HAND MADE SUPPOSITORIES FROM THE THEORETICAL WEIGHT OF 2 GRAMS

		Number of Suppositories in Each Batch That Deviate from the Theoretical by—				
Batch Number	Average Weight in Gm.	5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
1	1 791	2	5	2	1	
2	1 946	10				
3	2 025	4		2	3	1
4	2 009	9	1			

5	1 713		1	5	2	2
6	1 840	2	3	1	1	3
7	2 236	4	3	1	1	1
8	2 049	2	4	3		1
9	1 952	5	3	1	1	
10	2 068	4	1		4	1
11	2 117	4	1	3	2	
12	1 911	8	1	1		
13	1 555	1		3	2	4
14	1 710	5	3	1	1	
15	1 999	4	2	4		
16	2 034	4	4	1	1	
17	1 934	7	1	1	1	
18	2 025	8	1	1		
19	1 960	2	6	1	1	
20	2 044	8	2			
21	1 943	6	3	1		
22	2 008	6	1	2	1	
23	2 010	5	4	1		
24	2 081	1	8			1
25	2 017	8	2			
26	1 765	2	3	3	2	
27	1 876	9	1			
28	1 894	4	4	1	1	
29	1 721	3	1	1	1	4
30	1 844	6		2	2	
31	1 853	2	2	3	2	1
32	2 193	4	4			2
33	2 161	1		5	4	
34	1 683		1	2	1	6
35	2 071	4		3	1	2
36	1 683	1	3		2	4
37	1 843	5	2	1	2	
38	1 959	5	4	1		
39	1 819	3	3	2	1	1
40	2 256	1	3		5	1
41	1 905		6	4		
42	2 051	7	3			
43	1 886	4	3	1	1	1
44	1 962	4	1	3	2	
45	1 942	3	1	4	1	1
46	1 919	3	4	2		1
47	2 064	9	1			
48	1 913	7	3			
49	1 830	2	6	2		
50	2 176	6	2	1		1
51	1 774	2	2	2	3	1

Batch Number	Average Weight in Gm.	Number of Suppositories in Each Batch That Deviate from the Theoretical by— 5% or Less.	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
52	1 954	4	3	1	2	
53	2 130	6	2		1	1
54	2 183	1	4	2	3	
55	1 677		1	1	6	2
56	2 047	6	3	1		

57	1 631			2	2	6
58	2 157	3	3	2	2	
59	2 015	1	3	5	1	
60	1 915	6	2	1	1	
61	1 867	5	3	2		
62	2 054	5	4			1
63	2 349	2	2	2		4
64	1 863	3	4		1	2
65	2 094	4	3	2		1
66	1 982	6	4			
67	1 690		1	3	4	2
68	2 046	4	3	3		
69	2 000	1	5		2	2
70	2 032	5	4	1		
71	2 351	1	2	3		4
72	2 214	3	1	1	3	2
73	2 244	3	5	2		
74	1 984	4	1	4	1	
75	1 883	6	3	1		
76	2 153	3	5	2		
77	1 939	5	4		1	
78	1 935	9		1		
79	2 041		6	4		
80	1 850	4	4		1	1
81	1 760	2	2	2	2	2
82	1 815	5	1	1	2	1
83	1 845		10			
84	1 974	3	3	4		
85	2 048	3	3	1	3	
86	2 036	7	2	1		
87	2 039	6	2	2		
88	1 979	3	5	1	1	
89	1 638			2	7	1
90	1 863	2	5	3		
91	1 880	6	3			1
92	1 860	7	2	1		
93	1 994	5	4	1		
94	1 877	4	3	2	1	
95	2 008	3	4	3		
96	1 940	6	3	1		
97	2 185	4	1	1		4
98	1 926	6	3	1		
99	1 873	4	4	2		
100	2 121	3	3	2	2	
	Totals	395	271	155	102	77

The data presented in Table III show that for a total of 1000 hand-made suppositories prepared by 100 different operators, 66 6 per cent fall within a deviation of 10 per cent of the theoretical weight, 82 1 per cent fall within 15 per cent, while 92 3 per cent fall within 20 per cent

VARIATION IN CAPACITY OF SUPPOSITORY MOLDS IN TERMS OF CACAO BUTTER

A second series of tests was carried out to determine to what extent suppository molds used in retail pharmacies in the City of Baltimore varied in capacity

TABLE IV —PERCENTAGE DEVIATION OF HAND-MADE SUPPOSITORIES FROM THE THEORETICAL LENGTH OF 25 MILLIMETERS

Number of Suppositories Prepared	Number of Suppositories That Deviated from the Theoretical Length by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	20% or Over
1000	624	214	124	37	1

The percentage deviation from the theoretical length of 25 millimeters show that 62 4 per cent fall within 5 per cent, 83 8 per cent fall within 10 per cent, 96 2 per cent fall within 15 per cent, while 99 9 per cent fall within 20 per cent

For these tests, ten different sets of suppository molds were borrowed at random from retail drug stores and the capacities of the individual molds determined in terms of cacao butter

To obtain the desired data, suppositories of cacao butter were prepared by fusion in each of the ten sets of molds borrowed The melted cacao butter was cooled to the congealing point and then poured into the well-cooled molds The excess was removed by running the edge of a spatula over the top of the molds immediately after the cacao butter had solidified The individual suppositories were then weighed and the weights recorded

A summary of the results of the second series of tests is given in Table V

TABLE V —CAPACITY OF SUPPOSITORY MOLDS IN TERMS OF CACAO BUTTER

No of Sets of Molds	Av Capacity in Gm	S D in Gm	No of Sets of Molds	Av Capacity in Gm.	S D in Gm
1	1 493	0 008	6	2 032	0 022
2	2 095	0 009	7	1 390	0 027
3	1 915	0 026	8	1 975	0 023
4	1 887	0 014	9	1 481	0 051
5	2 400	0 023	10	1 318	0 037
			Average	1 798	0 024

The data obtained in this series of tests show that the weight of individual suppositories made with the ten sets of borrowed molds range from a low of 1 255 Gm (in mold No 10) to a high of 2 440 Gm (in mold No 5), or a difference of 1 185 Gm

The average capacity in grams in terms of cacao butter of all of the ten sets of suppository molds as shown in the table is 1 798 Gm , while the average standard deviation is 0 024 Gm On further study of the table it will be observed that the deviations for six of the sets of molds fall within the average standard deviation of 0 024 Gm , three fall within twice the average standard deviation or 0 048 Gm , while only one falls within three times the average standard deviation or 0 072 Gm

To make it possible to compare the results presented in Table V with similar data that may have been published but which have not been expressed in terms of the standard deviation, the per cent of deviation has been calculated

The weights of the individual suppositories showed the variation from the average to be less than 5 per cent in every instance, except for the suppositories prepared with mold No 9 In the latter case the weight of 90 per cent of the suppositories fell within 5 per cent of the average weight, while in the remaining 10 per cent there was a variation of 9 8 per cent from the average weight On ex-

amination, it was discovered that some of the individual molds of this set were bored deeper than others

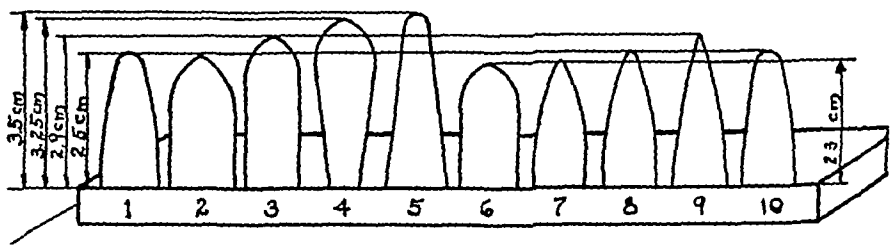
The per cent deviation from the theoretical weight of 2 Gm of cacao butter has also been calculated, the results are given in Table VI

TABLE VI —PERCENTAGE DEVIATION BASED ON THE THEORETICAL WEIGHT OF 2 GM OF CACAO BUTTER

No of Sets of Molds	Percentage of Individual Suppositories Deviating from 2 Gm by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	From 20% Plus to 25%	25% or More
1					60%	40%
2	87 5%	12 5%				
3	75 0%	25 0%				
4	50 0%	50 0%				
5				62 5%	37 5%	
6	100%					
7					40 0%	60%
8	100%					
9					40 0%	60%
10						100%

The variation in length and the difference in shape of the suppositories prepared with the ten sets of suppository molds used are shown in Table VII

TABLE VII —VARIATION IN LENGTH AND SHAPE OF SUPPOSITORIES PREPARED IN THE 10 SETS OF MOLDS



EFFECT OF DIFFERENT METHODS OF FILLING ON THE CAPACITIES OF SUPPOSITORY MOLDS

A third series of tests was carried out to determine to what extent, if any, the capacity of suppository molds is affected by the method of filling With this objective in view suppositories of cacao butter were prepared in the same mold by each of the following methods

1 Melting and pouring cacao butter into well chilled molds

2 Preparing rough suppositories by hand then forcing them into the mold to obtain a uniform shape

3 Preparing suppositories by compression in a suppository machine

The results of this series of tests are presented in Table VIII

TABLE VIII —EFFECT OF THE METHOD OF FILLING ON THE CAPACITIES OF SUPPOSITORY MOLDS

Method of Preparation.	Capacity in Gm of Cacao Butter 1	2	3	4	Average Capacity in Gm	S D in Gm	Per Cent Deviation
Melting and pouring into mold	2 300	2 305	2 305	2 285	2 298	0 008	0 34%
Massed and forced into mold	2 200	2 220	2 300	2 225	2 236	0 037	1 70%
Made by compression in machine	2 395	2 390	2 380	2 345	2 377	0 019	0 79%

An examination of the results in Table VIII shows that the method of filling has a definite influence upon the capacities of suppository molds Based on the results obtained it may be stated that the capacity in grams of cacao butter, beginning with the smallest and ending with the largest, varies in accordance with the following order of arrangement (1) Suppositories prepared by hand and then forced into the molds to shape, (2) suppositories prepared by melting the ingredients, then pouring into well-chilled molds and allowing to solidify and (3) those made by compression in a suppository machine Likewise, it will be found that the greatest variation in weight occurs in the suppositories prepared by hand and forced into the molds to shape, while the most uniform are those prepared by fusion

The variation in capacity due to a difference in the method of filling the molds as observed in the above tests was surprisingly small being less than 2 per cent for all suppositories except in the case of those prepared by hand and then forced into the molds when it was less than 3 5 per cent All of the suppositories in this series fall within twice the standard deviation

CONCLUSIONS

1 The weight of suppositories prepared by hand varies with the working temperature, the technique of the individual operator and the size and shape of the suppository to be prepared

2 The results of the first series of experiments show that 92 per cent of a total of 1000 different suppositories prepared by 100 different operators fall within twice the average standard deviation for weight of 0 344 Gm This corresponds to a variation of 17 2 per cent when based upon the theoretical weight of 2 Gm

3 The results of our experiments showed that there is no greater variation in length than in weight of suppositories made by hand if a definite length is decided upon In ordinary practice, however, this is not true as there are no official standards for length, and each pharmacist makes his own standards

4 Individual suppositories in a set of molds do not vary in capacity beyond reasonable limits There was observed, however, a great variation in the capacity of the sets of suppository molds as used in different retail drug stores The latter variation is believed to be due to the fact that the manufacturers of suppository molds do not have any definite specifications to follow

5 A difference in the method of filling was observed to have an appreciable effect upon the capacities of suppository molds

(*To be continued*)

THE OPENING SESSION

Time has once more brought us round to the renewal of those medical studies of which pharmacy is a branch Year by year it assumes a more definite character, and the period is not far distant when both in teaching and in practice it will occupy an independent place At Bloomsbury Square, where official pharmacy is enshrined, history was seen to repeat itself, there was the same crowd of visitors and friends to welcome successful candidates, the same band of young aspirants who had gained distinction, the same professional congratulations, and a lecturer to give the accustomed introduction address Retrospect of Fifty Years Ago —*The Chemist and Druggist* October 15, 1884

A PHYTOCHEMICAL STUDY OF CANCHALAGUA PANAMENA *

BY ROBERTO A BENEDETTI [1]

Canchalagua Panamena, very much like the *Erythræa chilensis*, Pers is a Gentianaceæ of the species *Schultesia lisianthoides* (Paul Standley) It grows in the Savannas just outside of Panama City

The plant, *Canchalagua Panamena*, varies from 7 cm to 30 cm in height, the stem is quadrangular throughout with branches opposite The leaves are linear and opposite consisting of five nerves The dirty pink solitary flower is about 15 mm long and it comes out of an elongated capsule which later contains the numerous tiny seeds All parts of the plant have a very bitter taste

For many years the farmers in the Interior of the Republic of Panama have used Canchalagua as a febrifuge The therapeutic use of the drug is that of a febrifuge in malarial fevers, as a tonic, and for regulating the liver against jaundice The therapeutic dosage is, as a tonic, 120 cc of a 1% infusion, as an anti-icteric and febrifuge 240 cc of a 3% infusion The soft extract may be used in doses from 0 20 cg to 1 Gm and the powdered drug from 1 Gm to 5 Gm

A representative sample of the entire plant was analyzed according to the U S P methods with the following results

Total ash	5 67%
Moisture (for non-volatile constituents)	9 27%
Alcohol-soluble extractive	9 58%
Diluted alcohol soluble extractive	12 50%
Water soluble extractive	9 97%

A 25-Gm sample of the air-dried drug was reduced almost to a powdered form and extracted in a Soxhlet extraction apparatus with several solvents Ether, ethyl alcohol and water were the solvents used and in the order mentioned

The ethereal extraction was acid to litmus paper, taste, bitterless, color, emerald green The ether was evaporated from the extract and a solid like mass was obtained weighing 1 31 Gm (5 24% of the drug) The extract had a waxy appearance and tasted like wax

The bitter alcoholic extraction gave an acid reaction with litmus paper A few cc of the extract showed a beautiful emerald green coloration, but a larger quantity was reddish brown The alcoholic extract was tested for alkaloids with Mayer's reagent and picric acid giving negative results The extract after evaporation to a glucose consistency, weighed 5 52 Gm (22 08% of the drug) In order to obtain a purer product, the extract was treated 3 times with a mixture of 20 cc of ether, 5 cc of alcohol and 15 cc of water in a separatory funnel The water solution from the separatory funnel was evaporated—the reddish brown jelly like substance obtained was intensely bitter, acid in reaction and insoluble in ether This mixture was then treated with ethyl alcohol in which most of the extract dissolved The filtrate was evaporated to determine if crystals would be formed but unsuccessfully, a reddish brown jelly like substance separated This substance was intensely bitter, acid to litmus paper and when hydrolyzed with dilute hydrochloric acid reduced Fehling's solution

The aqueous extract from the Soxhlet extractor was acid to litmus paper Its solution tastes bitter when fresh, but on standing becomes practically bitterless The reddish brown extract was evaporated to a solid like consistency and weighed 3 45 Gm (13 80% of the drug)

* Joint Session, Scientific Section and Section on Practical Pharmacy and Dispensing A PH A, Washington meeting, 1934

[1] Panama City, Panama

The extract showed the absence of alkaloids After dissolving the extract in a little distilled water and then diluting with ethyl alcohol a bitterless brown gum precipitated

A 10 per cent infusion of the drug was acid to litmus paper and reduced Fehling's solution, showing that it contained a free acid and glucose A few drops of Ferric Chloride solution added to the infusion gave an ink

About 16 Gm of cut Canchalagua was percolated with ethyl alcohol A part of the percolate, after concentration, failed to reduce Fehling's solution Then another portion of the percolate, 30 cc, after being boiled for one-half hour with 2 cc of a 5% hydrochloric acid reduced Fehling's solution This reaction showed the presence of a glucoside

Several methods were employed to obtain a glucoside but without success, probably due to the small quantities of drug used In one of the methods, the drug was boiled with milk of lime to remove the tannin The filtrate, after evaporation to a soft extract, was digested with ethyl alcohol and filtered, to this, ether was added, but no precipitation was obtained

CONCLUSIONS

1 *Canchalagua Panamena* resembles *Erythræa chilensis* physically and therapeutically

2 Uses of the drug febrifuge, anti-icteric and tonic

3 The most important constituents of the drug are a bitter glucoside, free acid, a sugar, wax, gum, tannin and green coloring matter

REFERENCES

1 'Oficina de Farmacia de Pontes"
2 "Flora of the Panama Canal Zone," by P Standley
3 'Materia Medica," by D Culbreth
4 'Elementos de Materia Farmaceutica," de J G Pamo

NOTE I wish to thank Professor M J Andrews of the University of Maryland for asking me to write this paper, and also Brother Higino and A F Alba, Herbalists of Colegio La Salle in Panama City, for their cooperation in the classification of the drug

---

SOME TIMELY FORMULAS FOR THE CHIROPODIST *

BY ADOLPH F MARQUIER

It has always been a fitting effort on the part of the pharmacist to prepare for the members of the healing art, suitable medicinal preparations to meet the various conditions that present themselves daily In the past and the present we have and are giving considerable time and thought to the human machine and its ailments but our feet only in recent years are receiving scientific consideration and in the writer's opinion there is a great future in this line of endeavor There are at present a number of formulas in use by the practitioners of this art and the writer is taking the liberty of submitting a few of the formulas which in experience have proven some value

* Section on Education and Legislation, A PH A, Washington meeting, 1934

SOLUTION OF ALUMINUM CHLORIDE COMPOUND

Aluminum Chloride	50 0 Gm.
Alcohol	120 0 cc
Oil Lavender Flowers	0 6 cc
Tincture of Cudbear	0 6 cc
Water	
To make	500 0 cc

Use for Bromidrosis

Directions Apply at night and morning

SPIRIT OF MENTHOL COMPOUND

Menthol		4 0 Gm
Camphor		4 0 Gm
Oil Lavender		
Oil Bergamot	of each	1 5 cc
Oil of Orange Flowers		0 3 cc
Alcohol 70%		500 0 cc

Mild counter irritant and refrigerant

SPIRIT OF THYMOL COMPOUND

Benzoic Acid	8 0 Gm
Salicylic Acid	8 0 Gm
Thymol	5 0 Gm
Methylene Blue	0 120 Gm
Oil Neroli	0 300 cc
Alcohol 70%	500 0 cc

Epidermophytosis—Athlete's Foot

We have had official for a number of years the salicylic acid, Indian Hemp, collodion, Whitfield Ointment, compound talc powder, inunction menthol comp, Stainless Iodine Ointment All of these preparations are extensively used by both the doctors and the laity

AN ENTERIC COATING FOR TABLETS *

HAROLD A JOHNSON[1] AND RALPH W CLARK [2]

The writers have reviewed the more commonly used American textbooks as well as journal literature searching for references on enteric coatings for pills, capsules and tablets Salol or mixtures of salol with other substances seem to be the materials favored by most writers Salol is made use of in certain commercial enteric coated tablets Enteric coated Glycotauro tablets are coated with salol (1), enteric coated tablets, Neutral Acriflavine-Abbott, are coated with shellac and salol while enteric coated tablets, Neutral Acriflavine-National, are coated with salol containing some keratin (2) Several methods of applying salol coatings to pills and capsules have been suggested Apparently, however, little work has been done on developing a method of applying a salol coating to tablets in a manner which

* Section on Practical Pharmacy and Dispensing, A PH A, Washington meeting 1934

[1] Senior Student in Pharmacy, University of Wisconsin

[2] Instructor in Pharmacy, University of Wisconsin

could be used satisfactorily by the retail pharmacist The present paper deals with a simple method of salol coating tablets

Pills, capsules and tablets are the accepted modes of administration of medicines which need only to be taken in small quantities They are used to advantage for bad tasting drugs Pills and tablets may be coated to further disguise bad tastes and all three modes of administration may be coated in such a manner as to make them reach the intestines before they dissolve or disintegrate Capsules may also be treated with formaldehyde to render the gelatin insoluble in the acid juices of the stomach

Pills, one of the oldest forms in which medicines are given, were probably first experimented with in an attempt to secure an enteric coating In 1884 Dr Unna (3) experimented with keratin as an enteric coating Keratin is now generally held as of little value for this purpose Previous to 1884 fatty and resinous substances had been employed (4) Beginning with the third edition, the National Formulary has given a method of salol coating pills by rotating them in successive, small amounts of salol, thus applying several thin coats Salol or a mixture of salol with other substances may be applied in liquid form by spraying a solution on the pills while agitating them in a suitable dish

An enteric coating may be applied to capsules by similar methods However, Cook and LaWall, in the seventh edition of Remington's Practice of Pharmacy (5), point out that greater care is necessary to secure complete coating They also state that the capsules being flexible and the coating very brittle, it is necessary to handle them with care to avoid cracking off the coating Husa and Magid (6) came to the conclusion that a coating applied by spraying a mixture of salol, stearic acid and an alcoholic solution of shellac is satisfactory Bukey and Rhodes (7) studied the treatment of gelatin with formaldehyde and recommend as a method to be used by the pharmacist an immersion for 5 to 15 seconds in a 10% formaldehyde solution They also used gelatin-coated pills in their study

Tablets may be coated by spraying a solution of the material or materials upon them while they are being agitated Wruble (8) developed a coating consisting of shellac, suitable for large scale production He made use of a 25% solution in equal quantities of alcohol and ammonia Because of their shape, tablets, like capsules, do not lend themselves to the National Formulary and similar methods of coating Therefore the following method for salol coating of tablets has been developed Although this method is not all that is to be desired, it may be used to coat a dozen tablets in about one-half hour's time after the operator becomes familiar with the technique involved

A METHOD FOR SALOL COATING TABLETS

Melt a sufficient quantity of salol in a 4-inch casserole on a water-bath to completely cover a tablet upon dipping it into the melted salol When the melted salol reaches the temperature of from 45–50° C (salol melts between 41–43° C), grasp the tablet to be coated on its narrow sides with a pair of tweezers, the points of which have been bent inward, and dip the tablet into the melted salol Remove and keep the tablet moving in a circular motion in the air until the salol congeals Shift the tweezers to a new position on the tablet and repeat the operation until a coating of the desired thickness is obtained Usually three dippings are enough

To make the coating smooth and glossy, grasp the coated tablet with tweezers and pass it quickly through a Bunsen flame

Test tablets containing methylene blue and calcium sulphide for determining the effectiveness of the coatings were prepared by the formula used by Wruble (9) The tablets were compressed on a Stokes hand-operated tablet machine As considerable inconvenience was experienced with Wruble's formula, the following was developed with no changes in the quantities of the two active ingredients

Methylene blue	1/4 gram
Calcium sulphide	1/2 gram
Lactose	3/4 gram
Starch	1 1/2 gram
Purified talc	1 1/4 gram
Sugar	3/4 gram

Granulate with a gelatin solution prepared as follows

Pour upon 180 grains of gelatin sufficient water to cover it and allow it to stand one hour, then pour off the water Transfer the washed gelatin to a dish, add 240 minims of glycerin and sufficient water to make four fluidounces Heat on a water-bath until the gelatin is dissolved Use while warm

There is some question about the effectiveness of these tablets for testing enteric coatings as several students reported no eructations of hydrogen sulphide after taking the uncoated tablet

The test tablets were coated with the salol as described above Sixty students were each asked to take one of these tablets Five reported eructations of hydrogen sulphide gas Three reported no reaction The balance of the group reported blue coloration of the urine This is evidence that the salol coating does not dissolve in the stomach, but dissolves in the intestinal fluids allowing the tablet to disintegrate there

BIBLIOGRAPHY

(1) New and Nonofficial Remedies (1934), 110
(2) *Ibid*, 178
(3) P G Unna, *Pharm Zentralh*, 25 (1884), 577, from *Fortschr Med*, 15 (1884), 507 and Jour A Ph A, 10 (1921), 372
(4) A G DuMez, Jour A Ph A, 10 (1921), 372
(5) E F Cook and C H LaWall, "Remington's Practice of Pharmacy," 7th Edition (1926), 1683
(6) W J Husa and L Magid, Jour A Ph A, 21 (1932), 1030
(7) F S Bukey and P Rhodes *Ibid*, 22 (1933), 1253
(8) M S Wruble, *Amer J Pharm*, 102 (1930) 326 (9) *Ibid*, 327

Wholesale Drug Analysis—An analysis of wholesale drug operations, based on an eight months' study of a typical wholesaling establishment, has been published by the Bureau of Foreign and Domestic Commerce of the Department of Commerce as a bulletin—'Domestic Commerce Series—No 86" The work reported was supervised by Wroe Alderson on a plan laid out by John R Bromell The study was made and the report prepared by Edward J Carroll Detailed statistical records and comment are given on selling buying, commodity coverage, storage transportation, finance and risk bearing, a comparative tabulation being included which covers eight types of drug wholesaling The data are broken down for departments and although the author disclaims any purpose of critically analyzing the trade as a whole, his records being factual have a wide relative value The bulletin comprises 110 pages It is for sale by the Superintendent of Documents Government Printing Office, Washington, at 15 cents a copy

MEDICAL AND PHARMACEUTICAL CONTRIBUTIONS TO ELECTRICAL SCIENCE *

BY CHARLES WHITEBREAD [1]

Pharmacy and medicine have played an important rôle in the development of electrical science because pharmacists and physicians were among the first to make practical use of this agency, and because it was the discoveries, studies and writings of these men which furnished the impetus for the early investigations and researches that have made electricity the agency for good which it is to-day

Our science, and science generally, does not need champions to proclaim the part taken in human progress, as the accomplishments of the past and of the present speak for themselves It is a human failing, however, to accept the benefits which come to us as the direct result of the scientific investigations which have made the forces of Nature our servants, and to forget the part taken by mankind to make possible the comforts and conveniences which we now enjoy Let us, therefore, see how we obtained the fundamentals of our knowledge of electricity, noting particularly the contributions of our own and affiliated professions, and how medicine generally has benefited from a branch of science based in no small degree on the discoveries of medical men

The earliest mention of electricity is supposed to have been made by the Ionian philosopher, Thales of Miletus, who died about 548 B C , and who discovered that if a piece of smooth amber is rubbed with a dry cloth it attracts light bodies placed near it Although Thales was regarded as one of the seven wise men of ancient Greece, it is recorded of him that he thought amber possessed a soul, and that it was nourished by substances which it attracted to itself Natural magnets were known in Europe more than two thousand years ago, and the Chinese have used them since 600 B C They were portions of lodestone, native oxide of iron, and the word magnet came into use because this ore was found in Magnesia, Asia Minor

The observations of Thales concerning amber, and of others relative to the magnet, remained without development until the 16th century, when Dr William Gilbert, physician to Queen Elizabeth of England, published a treatise on the magnet in the year 1600, giving the results of the experiments which he had conducted up to that time This physician was the discoverer of frictional electricity in a large number of substances, of static electricity, the repulsion of similar and the attraction of dissimilar poles of the magnet, the diversion of the magnetic needle by electricity, the strengthening of a magnet by an armature, the fact that iron bars become magnetic along the magnetic meridian, that the earth itself is an enormous magnet, etc We are also indebted to Dr Gilbert for the name electricity which was derived from a Greek word meaning amber, and his investigations of a subject which had lain dormant for more than two thousand years, marked the inauguration of the experiments and researches which have since added so greatly to our fund of knowledge

A German scientist, Otto vonGuericke (1602–1688), made the first electric machine, which consisted of a globe of sulphur on an axis mounted in a frame,

* Section on Historical Pharmacy, A PH A , Washington meeting, 1934

[1] Assistant Curator, Division of Medicine, U S National Museum

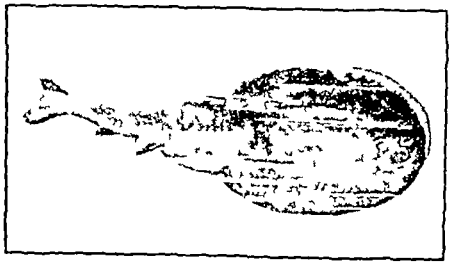


Fig 1 —The Electric Ray (*Torpedo galvani*) This fish, common in the tropical seas, was the source of the static electricity first employed in the treatment of disease It was an animal drug at the beginning of the Christian Era

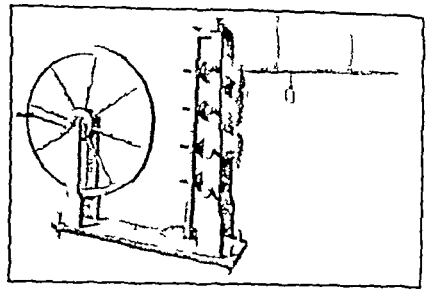


Fig 3 —Dr Watson's Electric Machine The mechanical rubbers are to the left of the globes, and the conductor is suspended by silk cords on the right (From Priestley's 'History of Electricity,' 1775)

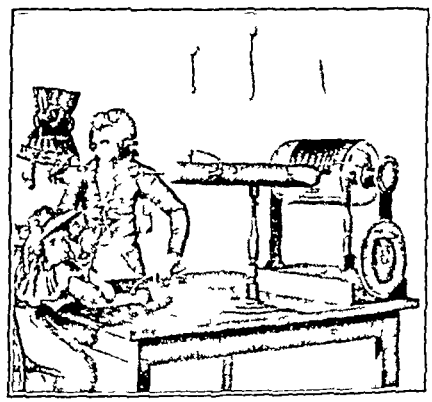


Fig 4 —Administration of static electricity (From a print published in 1799)

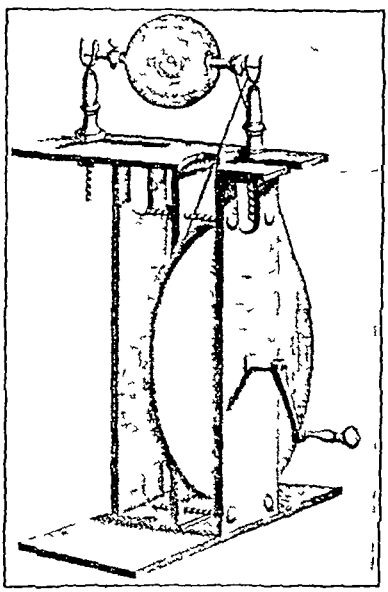


Fig 2 —Hawksbee's Electric Machine An early improvement on the first electric machine made by von-Guericke (From Priestley's "History of Electricity,' 1775)

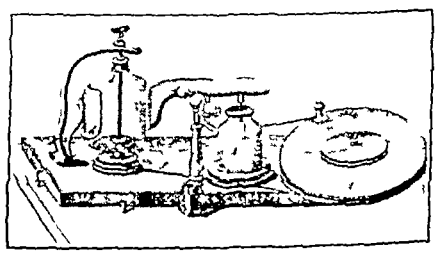


Fig 5 —Read's Cylinder Machine One of the early types of electric machines especially constructed for medical purposes (From Priestley's History of Electricity" 1775)

and discovered the electric spark, observing the crackling sound which accompanies it Francis Hawksbee, in 1709, improved the electric machine, substituting a globe of glass for vonGuericke's sulphur globe In both of these machines the

hand was used to supply the necessary friction, but it was not long before a mechanical rubber and a prime conductor were added to the apparatus The frictional electric machine was improved by others, and soon a special machine for medical purposes was in use

In 1729, Stephen Gray, while experimenting with a medicated tube, found that he could convey an electrical charge to a distance by a hemp string Later he found that when a wire 700 feet long, and hung on loops of silk, was connected at one end with the glass tube, and the tube was rubbed, the other end was electrified and would attract light bodies This discovery was the first to introduce the distinction between conductors and non-conductors, and was the origin of our knowledge of insulators

In 1745, the properties of the leyden jar—so-called because many of the early experiments were conducted at the University of Leyden, Holland—were discovered by vonKleist, Cuneus, Allamand and Muschenbroek, and affirmatively answered the question "Can electricity be stored?" Sir William Watson, M D, in 1747 and 1748 took part in the experiments by which an electrical discharge from a leyden jar was "extended to four miles in order to prove the velocity of its transmission"

In America, Benjamin Franklin distinguished between positive and negative electricity, in 1747, and demonstrated the identity of the electric spark and lightning in 1752 He also devised the lightning rod, and took such an active part in the study of frictional electricity that it is sometimes called franklinic electricity

Up to this time researches had been confined to studies of static or frictional electricity, that is, electricity in a condition or state of rest, but in 1791, an Italian physician and professor of anatomy, Luigi Galvani, by his famous frog experiments, laid the basis for the discovery of dynamic electricity, that is, electricity in motion An Italian physicist, Alessandro Volta, when following up the work of Galvani, in 1799, devised the voltaic pile, the first electric battery Volta's pile, a vertical column of several pairs of zinc and copper disks separated by moist cloths, supplied the knowledge that electricity is generated by chemical action This pile was found to be charged with positive electricity at its lower extremity and with negative electricity at the upper extremity When wires attached to these extremities were brought into communication with each other and then separated, a minute spark was observed which corresponded to the spark obtained from the frictional electric machine Electricity produced by Volta's pile was called voltaic, galvanic, battery or primary electricity

Until the year 1820 electricity and magnetism were regarded as distinctly separate sciences, but in this year Hans Christian Oersted,[1] a professor of physics at Copenhagen, proved the intimate relationship between the two, when he observed that a wire in which a voltaic current was passing deflected a magnetic needle suspended near it Oersted's experiments and those which followed by Ampere, Weber, Arago and Sturgeon marked the discovery of electro-magnetism, and introduced an important era of electrical research which was participated in by many eminent authorities Michael Faraday, in England, and Joseph Henry, in the United States, almost simultaneously made the discoveries that gave us

[1] Son of a pharmacist—see JOUR A PH A, April 1931, page 370

our knowledge of induced currents, and furnished the fundamental information which made possible the modern era in the history of electricity

Among the earliest applications of electricity to human welfare was its use in the treatment of disease The compass was of great service in navigation, and Franklin's rods had provided a safe method of protecting buildings from lightning The real advances in the way of putting electricity to practical use, however, only date from the time of Faraday and Henry, the great men who, by their experiments and researches, made possible many of the conveniences which we enjoy to-day One of the first of these modern applications was telegraphy, the telephone was another, and magneto-electric and dynamo-electric generators and motors are now so common that we are inclined to forget that their introduction has taken just about a century

The practical applications of electricity have come with such rapidity since the days of Faraday and Henry that they cannot be considered in this brief article With the fundamental discoveries in mind, and a recollection that materia medica specimens were the chief source of electricity in the early days, that search for a means of curing disease stimulated investigation, and that medical men were leaders in electric experimentation, we can now turn our attention to a consideration of electrotherapy

The treatment of disease by electricity is called electrotherapy, and if the earliest employment of remedial substances whose real or supposed efficacy depended on electrical phenomena are included under this term, electrotherapy can claim an antiquity as great as some of the oldest branches of medical science The fish known as the "electric ray," common in the tropical seas, was the source of the static electricity first employed in the treatment of disease A Roman compiler of materia medica, Scribonius Largus (14–54 A D), was the first to recommend the use of electric shock as communicated by this fish in the treatment of severe headaches Galen, "The Father of Pharmacy," and the most famous of the Græco-Roman physicians at the beginning of the Christian era, also prescribed shocks from the "electric ray" for the cure of headache, and classical writers of this time spoke of this form of medication in cases of cramp, paralysis, gout, diseases of the joints and disorders of nervous origin In his "Natural History" Pliny refers to the electric ray as if its use as a therapeutic agent was quite general He says "From a considerable distance, even, and if only touched with the end of a spear or staff, this fish has the property of benumbing the most vigorous arm, and of riveting the feet of the runner, however swift he may be in the race If, upon considering this fresh illustration, we find ourselves compelled to admit that there is in existence a certain power, which by the very exhalations, and, as it were, emanations therefrom, is enabled to affect the members of the human body, what are we not to hope for from the remedial influences which Nature has centered in all animated beings?" Later on, the *Gymnotus electricus*, or electric eel of South America, was of interest as the subject of much experimentation because it was able to administer a much more powerful shock than the electric ray

The natural magnet, or lodestone, was a form of primitive electrotherapy, which comes under the heading of magic medicine, as whatever effect was produced by holding it in the hand or wearing it suspended from the neck must have been a psychological one which arose from the superstitious belief that the characteristic

properties of the magnet gave it the power to attract or repel the causes of disease The oldest account of the use of the magnet in medicine is ascribed to Aetius, physician to Justinian I (A D 527–565), who said "We are assured that those who are troubled with the gout in their hands or feet, or with convulsions, find relief when they hold a magnet in their hand" Johannes Arculanus, a professor at Bologna and Padua during the 15th century, is said to have endeavored to remove splinters of iron from the eye by means of the attraction of amber electrified by friction Paracelsus, one of the most famous of the 16th century European physicians, made use of the magnet in the treatment of toothache and other disorders Later it was used in the treatment of headache, and magnetic toothpicks and earpicks were extolled as remedies for disorders of the teeth and ears, and Kircher (1598–1680) speaks of the magnet being worn about the neck to prevent convulsions and nervous diseases While most of these early attempts to utilize a force concerning which little was known were based on "the influence of imagination in the cure of disease," still they served the very good purpose of keeping alive the interest in electrical science and electrotherapeutics

The electrotherapy of the 18th century was confined to the electrification of patients and the administration of shocks by means of electric machines and leyden jars Professor Jallabert, of Geneva, in 1748, noticed the phenomenon of muscular contraction resulting from electric stimulation, and Professor Kratzenstein (1723–1795), was among the first to employ electricity produced by these methods successfully, it being recorded that after fifteen minutes of electrification he cured a woman suffering with a contraction of the little finger Rossler introduced the electric bath as a remedial agent in 1768, Manduyt, in 1777, employed electricity in the treatment of amblyopia, Charles Darwin used it as a remedy for jaundice; and Hufeland recommended electricity for the relief of asphyxia

Exaggerated accounts of great cures effected in Europe reached America and prompted Benjamin Franklin to experiment with electricity as a therapeutic measure, and he related his experiences to a friend in this manner "People were brought to me from Pennsylvania and the neighboring provinces to be electrified, which I did for them at their request My method was to place the patient in a chair and draw a large number of sparks from all parts of the affected limb or limbs Then I fully charged six two-gallon jars, each of which had about three square feet of surface coated, and I sent the united shock through the affected limb or limbs, repeating the shock commonly three times each day" Franklin noted temporary improvements, but the general result of his attempt to utilize electricity for curative purposes seems to have coincided with the experience in Europe of the Abbé Nollet, who said he did not know of a permanent cure by electrification

Galvani's observation that the limbs of a freshly killed frog were thrown into violent convulsions when placed close to the prime conductor of a frictional electric machine led to much physiological experimentation, first upon invertebrates and later on warm-blooded animals These experiments supplied much valuable information with reference to the various forms of response to electric stimulation, and proved that both the voluntary and involuntary muscles were affected

At the beginning of the 19th century galvanic electricity was in use by physicians as a therapeutic measure particularly for the treatment of those diseases

which had been found to receive benefit from frictional electricity Amateur investigators were proclaiming galvanic electricity as a specific for all kinds of nervous disorders and paralytic affections, deafness, blindness, suffocation, etc These unwarranted and unauthorized claims soon brought electrotherapy into such disrepute that the use of electricity as a therapeutic agent was temporarily discontinued

Modern electrotherapy dates only from 1847 when a French physician, Dr G B A Duchenne, discovered that individual muscles could be stimulated by the application of electrodes to the overlying skin Before this the general twitchings produced by an electric shock had been observed, but, as at that time all impairments of movements were included under the term "paralysis" the pathology of which was unknown, very little progress had been made in the way of specific electrotherapy Duchenne now devoted his attention to specific treatment, choosing as his subjects the class of incurable paralytic patients in the large hospitals of Paris He employed induced currents, and his success in restoring health to these sufferers was so great that it gave the special impulse which resulted in the formation of a practical specialty of electrotherapeutics Other men such as Remak, vonZiemssen, Erb, Addison, Crusell, Gull, Bird and Benedikt assisted in the modernization of electrotherapy, and widely extended the usefulness of electricity as a diagnostic and therapeutic agent

The general benefits which are derived from electricity are well known The benefits which have come to medicine are not so familiar, but these, too, are so numerous that we can only skim the surface with the statement that the development of a method of measuring dosage, the discovery of X-rays, and the standardization of electrical apparatus for the purpose of diagnosis and treatment have brought about a true appreciation of electrotherapeutics All forms of electric current are now used in the treatment of disease, the kind of current and the way in which it is applied depending on the result to be effected, and the usefulness of electricity seems all the more wonderful when we consider that most of the cases successfully treated are those for whom there seems no further hope by other methods

If the placing in the hands of physicians of a curative agent for the relief of conditions which could not be helped by other remedial measures were the only benefit which had come to medical science, it would be amply repaid for the part it has taken in the development of electrical science It has received, however, an equal benefit in a diagnostic way, for what could be more wonderful than the X-ray machine which makes it possible to examine the "inside" of a patient, the electrocardiograph which graphically records the action of the heart muscle, the bronchoscope for inspecting the interior of the bronchial tubes, and the electrostethoscope by which the heart sounds can be intensified and heard for a considerable distance, not to mention the numberless other practical uses in medicine

When Franklin was asked what use there was in his electrical experiments he replied by asking "What is the use of a baby?" When Faraday was similarly questioned he responded that he was endeavoring to make electricity useful Franklin realized that electrical science was a very promising infant, and Faraday knew that the child must be put to work to overcome complaints such as the follow-

ing made in the year 1840 "It must be allowed, that the case has not been the same with electricity as with magnetism The latter, by the invention of the magnetic needle, has served to render navigation more secure, and to discover the new world, a source of new riches, new wants and of new evils to the old one But electricity has not yet produced anything of so much importance, to mankind, and to the arts, if we except the analogy now proved between the electric fire and lightning, an analogy which has given rise to a pretty sure preservative from the effects of that dreadful meteor, for in regard to the cures effected by electricity, it must be acknowledged that they are either rare, or not well ascertained"

Only a century has elapsed since the discoveries of Faraday and Henry introduced the modern era of electricity, and since Duchenne laid the foundation for present-day electrotherapy, but this short period of time has been sufficient to overcome all complaints concerning the uselessness of electricity The electrical inventions have come with such clock-like regularity that it would seem that they have been timed to keep interest in the subject alive, for as soon as the novelty of one invention waned another of even greater significance would be made to encourage the workers on to further effort

This review, which has purposely been made brief and consequently incomplete, including only a few of the items of great importance in the early stages of electrical development most likely to be overlooked by the present generation, calls to mind what great good can come from seemingly trivial experiments in the field of pure science

With the thought of the times focused on the matter of devising new methods of utilizing the universal servant, electricity, undoubtedly what we now regard as modern phases will before long be classed among the early ideas and undertakings of electrical science So while lauding, as we should, each new advance, let us occasionally call to mind that pharmacists and physicians, by fundamental contributions, helped to make electrical accomplishments and achievements possible

---

BARBITURATES ALLEGED DANGERS *

Gillespie (Guy s Hosp) contributes an exhaustive and reasoned article in defense of the barbiturates The article does not lend itself to abstraction but a few points may be mentioned A review of the published records to the end of 1932 fails to show a case in which these drugs, in single or repeated therapeutic doses, have caused death in the absence of complicating factors In complicated cases (with one possible exception) the drug has never been the essential cause of death The margin of safety (the ratio of customary maximum dose to minimum recorded lethal dose) is with barbitone 1 5 and with phenobarbitone 1 3, with the newer barbiturates data are not sufficient to permit such a calculation Idiosyncrasy has to be reckoned with in a proportion of cases—about 3 per cent or less, but this is chiefly a matter of skin conditions or neurological disturbances there is no case on record of a single therapeutic dose even in an idiosyncratic patient, having a lethal effect Contraindications or indications for caution, are (1) old age (smaller dose), (a) kidney disease, absolute except in pernocton or nembutal which are contraindicated in (3) liver diseases, (4) advanced heart or lung disease (smaller doses and not continued), (5) toxemia (sepsis or possibly hypothyroidism), (6) idiosyncrasy to be borne in mind on first administration Addiction may occur, but is unlikely, as the barbiturates do not afford the same euphoria as alcohol or morphine while their withdrawal is not accompanied by the same distressing results

* R D Gillespie *On the Alleged Dangers of the Barbiturates*" *Lancet* (February 17, 1934), 337-345

ANTOINE JEROME BALARD, PHARMACIST AND CHEMIST *

BY JOHN E KRAMER

In perusing the history of science we find in bold letters the names of many great men, workers in this field whose accomplishments have won for them great renown Yet, here and there, we see a name not so familiar, but still deserving more attention than has been accorded Let us take, for example, the case of Antoine Joseph Balard, French pharmacist and chemist, born in Montpellier, France, September 30, 1802 His education was laid along the lines of pharmaceutical training and was acquired under the Faculty of Sciences of his native town His teaching ability, however, was so pronounced that he soon became chemistry assistant, and later professor of Chemistry at the Royal College, the School of Pharmacy and the Faculty of Sciences at Montpellier

Balard qualified as a pharmacist and established himself in business What spare time he had after the demands of his professions had been met was spent in the work he liked best, chemical research The scene of his activities, Montpellier, is situated on the Mediterranean Sea, and a nearby salt marsh provided material for much investigation Certain startling reactions aroused his suspicions and after much intense work he came upon a substance which he ascertained to be a previously unknown element

Because of its odor, when its fumes came in contact with the air, the element was named bromine, after the Greek word "bromos" meaning stench The name, however, was bestowed upon the substance by the famous Gay-Lussac, after Balard had called it muride, from the world "muria," meaning brine Needless to say, Gay-Lussac's appellation remains to this day as the proper one

It is interesting to note that another famous man of that day, Liebig, had his hand, or rather, didn't have his hand in the early days of bromine Some years before the discovery Liebig had been sent, for assay, as an unknown, some nearly pure bromine which had been obtained as a by-product in the manufacture of salt He laid it aside, thinking it some other substance and, when bromine was announced, immediately placed his sample in his "Cupboard of Mistakes" to constantly remind him of his lost opportunity to be the discoverer of a new element

Balard was only 24 years old when he came upon bromine, in 1826, and his reputation and fame from this discovery were instrumental in his election to the chair of Chemistry in the Faculty of Sciences in Paris, succeeding L J Thenard, French pharmacist and chemist, famous for his discovery of hydrogen peroxide In 1844 he became a member of the Academy of Science and in 1851 he was appointed Professor of Chemistry in the College of France In this latter eminent position he had the famous Berthelot as a student, then as assistant and later as a colleague

The sea water which furnished him his clues for the discovery of bromine also induced him to devote much time to the problem of extracting soda and potash from the briny deep Fate was cruel in this instance, for just as he had mastered the problem, rich deposits of the substances he sought were found in the Stassfurt district He also conducted much research on bleaching compounds of chlorine,

* Section on Historical Pharmacy A PH A , Washington meeting, 1934

and was the first to advance the theory that bleaching powder is a double compound of calcium chloride and hypochlorite

Organic chemistry provided another field of investigation for Balard and we find records of his papers on the decomposition of ammonium oxalate, forming oxamic acid, papers on amyl alcohol, cyanides and the difference in composition between nitric and sulphuric ethers He was a frequent contributor to the "Annales de Chimie et de Physique"

In 1868 he was made Inspector General of Superior Instruction in France and on March 30, 1876, his death occurred in the city of Paris

ANTOINE JEROME BALARD

Let us take a look at Balard's character, for his attitude toward life and work was responsible for a great forward step in the advancement of Science It seems that this pharmacist-chemist, who had brought fame to himself in the discovery of bromine, was more or less content to ease along on the strength of what he had done With the praise that was bestowed upon him, he might have reacted in one of two ways He might have become conceited and overbearing or he might have been fired with the great ambition to find new worlds to conquer But, instead, he chose the middle path, continuing in his unperturbed, even manner to perform his experiments in the back room of his pharmacy, or else, as was his wont, wander around to the laboratories of his friends, seeing what they were doing, listening to their plans and making suggestions from his own wealth of information Goodness knows how many of his casual suggestions were put to work to the glory and fame of the user

However, we do know of one such instance Louis Pasteur, whose discoveries and works are so well known and so beneficial to us all, was in the midst of his efforts to solve the very perplexing problem of where microbes came from Some of the scientists of the day were backing the spontaneous generation theory, but Pasteur was of the idea that they came from the air, and were wafted by the air, on dust particles, to all the places where microbes were found Pasteur found his theory hard to prove, for, try as he might, he could not get his yeast mixtures, the medium of microbe cultivation that he used, dust free Every time he heated his flasks, dust-laden air would rush in and in a short time the microbes could be seen increased manifold Pasteur was up against a blank wall when Balard strolled in, heard the story, summed up the situation and rather nonchalantly suggested that Pasteur draw the necks of his flasks into the shape of an "S" lying on its side, patterned after the neck of a swan busily engaged in picking some article from the surface of the water The suggestion made, Balard continued on his visitation rounds, and re-

turned some time later to have Pasteur excitedly tell him of the success of the experiment Air had come back into the flasks through these queer shaped necks but no microbes had developed The germ-laden dust had been unable to go up through the up-turn of the horizontal "S"

But proof was still necessary, so Balard suggested that Pasteur shake his flasks so that some of the culture medium wash through the entire neck and then return to the main body of the flask Once more Balard sauntered out of the great man's laboratory, and once more Pasteur feverishly followed his advice Just as Balard had contended, the necks of the flasks gave up enough microbes to make the yeast soup swarm with newer generations in a very short time The spontaneous generation theory was shattered, and Pasteur was credited with the entire task De Kruif, in his "Microbe Hunters," describes Balard's nature very admirably in just one sentence Telling of a brilliant meeting of great scientists at which time Pasteur did his very efficient theory-exploding, the author said, "If Balard was there, you may be sure he applauded as enthusiastically as the rest A rare soul was Balard"

Although we find the preceding paragraph to be surprisingly true, Pasteur was deeply grateful to Balard for past favors done Balard had been one of Pasteur's teachers and personal advisers, and had been instrumental in obtaining Pasteur's connections with various investigations and with certain institutions That he was appreciative is shown when the position of Inspector General of Higher Education was left vacant Pasteur was immediately proposed for the post but at the same time Balard put in his application, whereupon Pasteur made this gracious gesture in writing, "Your Excellency must know that twenty years ago, when I left the École Normale, I was made a curator, thanks to M Balard, who was then a professor at the École Normale A grateful pupil cannot enter into competition with a revered master, especially for a post where considerations of age and experience should have great weight" Balard, consequently, received the position

Unambitious and indolent, rather given to watching others than doing his own work, Balard was content to let life take its course and human events pass their way unhampered by any more interference from him He is not as well remembered as others he taught in his school, helped in their laboratories and probably served in the capacity of a pharmacist, and who have received the recognition of time and history and remain forever in the minds of men

REFERENCES

"Four Thousand Years of Pharmacy" C H LaWall
"Lippincott's Pronouncing Biographical Dictionary" (1915)
"Encyclopædia Britannica," 11th and 14th Editions, American
"Microbe Hunters" Paul De Kruif
'Pasteur," Duclaux
"The Life of Pasteur" R Vallery-Radot

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE

The formation of State Associations was but the beginning of the work which the AMERICAN PHARMACEUTICAL ASSOCIATION has done to touch the life and the individual pharmacist and the health of the public

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Editor's Note The following paper on 'Effect of NRA Codes on Retail Trade' by an economist as well known as Mr Wroe Alderson is sure to command attention Your Editor can only urge that it be read with thoughtful care —C B JORDAN, *Editor*

EFFECT OF NRA CODES ON RETAIL TRADE

BY WROE ALDERSON

In considering the broad problem of the effect of NRA codes on retail trade there are five major aspects of the problem which may be considered These are

The volume of retail business done
The morale of retailers and their support of the Recovery Program
The competitive position of classes of retailers
The bargaining position of retailers and their suppliers
The efficiency of retail distribution

In so far as the activity of retail trade might be increased by the Recovery Program, it would mean nothing more, of course, than a reflection of the improvement in business as a whole This is aside from such general considerations as the relative improvement in consumer goods industries and capital goods industries Looked upon as a symptom of recovery, the volume of retail trade has not shown a particularly encouraging trend

The Bureau of Foreign and Domestic Commerce has been compiling several series to indicate the trend of retail trade for several lines Reports now available for the first three months of this year show a general increase in volume of retail business over the same three months of last year This is particularly marked in what is called the Rural Store Index This increase may result from the payments that have been made to various classes of farmers under the Agricultural Adjustment Program and to various other disbursements of relief funds in the rural areas The second greatest increase is in the case of automobiles The indications here point to a really fundamental increase in wide-spread purchasing among persons of moderate means Number of units purchased has increased much more than total volume of sales, indicating that a trend toward the more popular priced car At the same time automobile financing has increased more than either units or volume, which will undoubtedly be characteristic of an increase in automobile purchase among classes of moderate income

In other lines covered increases in value have been more than offset by increases in the retail price level In other words, there has apparently been fewer physical units of goods sold at retail rather than a greater number This may not mean that the total consumption of goods has actually been less since the various relief agencies have not used the existing channels of distribution in handling all commodities distributed on a relief basis

One of the most unfortunate consequences of NRA has been its effect on the morale of retail trade The National Recovery Administration began its work last summer in a way that indicated that it was not conscious of the importance or perhaps even of the existence of retail trade The first several months of policy development were based entirely on considerations of the problems of the manufacturer, particularly in the heavy industries The Administration came sharply up against the problem of retail trade when the Blue Eagle campaign was instituted General Johnson had been impatient with the progress attained on manufacturing codes but the Blue Eagle instead of accomplishing the results desired in that direction, involved him inextricably with considerations of retail distribution

One of the biggest aspects of the general problem of the effect of NRA on retail trade is thus the political problem of the effect upon the morale of retailers and through them upon public support of the Recovery Program arising from the peculiar way in which retailers came into the picture Having first been told both in print and in conversations with their representatives who came to Washington that the program was not primarily interested in the retailer and might overlook him entirely, the retailer, because of his direct contact with the consumer, might have been the agent for selling the whole program solidly to the entire country if he had been handled with more consideration

The policy originally announced of leaving considerations of retail trade for treatment at a much later date was probably a sound one It would have been a much easier problem to secure full compliance and strict enforcement against violators if only the larger manufacturing industries had been covered Securing compliance among retailers could naturally be expected to be a slow process because of the great number of small and sometimes irresponsible individuals engaged in the retail business Retail violations are likely to be well known in the community and widely discussed because the retailers' operations are so open to public inspection

From the standpoint of creating employment opportunities, the NRA could not perhaps afford to overlook retail trade with almost as many millions of people employed as manufacturing industries It can be stated with certainty, however, that these facts did not occur to the leading minds in the NRA until much later and as a matter of fact, the retail codes were never handled in such a way as to capitalize to any great extent the employment possibilities offered Ironically enough, the greatest single potential field for real employment was brought into the picture more or less accidentally through a failure to visualize the way in which the so called Blue Eagle campaign would immediately become involved with retailing

Effect of NRA on the competitive position of classes of retailers is one of the most interesting aspects of NRA and its consequences Various groups of competing business men have become highly specialized in the degree to which they make use of various competitive devices In the retail field three of the leading types of stores from the standpoint of competitive position have been limited price stores, cut price stores and service stores There are other lines of cleavage such as small and large stores, specialized and general stores and groups distinguished by particular method of operation such as the chain store and the mail order house

The line of division indicated in the first instance is the one which has been brought most sharply into the foreground by the attempt to set up NRA codes Some of the most vital code provisions carried threats of upsetting completely the

competitive equilibrium in retailing because these code provisions seemed likely to affect the position of one class of retailers more drastically than that of another class of retailers The limited price stores had made a place for themselves on the basis of fixed and well-known prices for a variety of items such as 10¢ for a tack hammer or $5 55 for a pair of shoes These stores had flourished during the past several years of declining wholesale prices Their greatest concern related to the possibility of drastic increases in the cost of labor which would make it impossible for them to maintain their present fixed price lines which were the principal basis of their merchandising appeal to the public One result of their having been so deeply perturbed over these matters was the formation of two brand new trade associations which called into their services two of the shrewdest merchandising men in the country These were Dr Paul Nystrom for the limited price variety stores and William Girdner for the fixed price chain shoe stores Up to the present this group has come off fairly well since the increase in labor cost was much less than they had feared it might be Some variety chains reported national improvement in their position as a result of the enforced wage increase They found that they were getting a better class of help at a higher minimum wage and that these employees were bringing courtesy and intelligent sales effort into the variety store operation for the first time

The service type of store was most concerned about the other step in the program for benefiting labor, namely, the shortening of hours, particularly as it implied or might require the shortening of store hours The downtown stores generally would have had their competitive positions somewhat improved in relation to the small neighborhood stores if there had been a drastic cut in the number of store hours permitted Many of these small merchants obtain a considerable portion of their total business solely because they are able to remain open for a longer number of hours than the larger store Here again the tendency of the NRA to deal gently with retailing so far as prescribing a new labor burden was concerned kept this second group of retail stores from suffering any loss of competitive efficiency in the direction which they particularly feared It would be very interesting to know just what was the basis of the very lenient policy concerning labor requirements in retail codes since some of those who were frankly representing the interests of the retailer at hearings admitted openly to administrative officials that their group was not being asked to carry their fair share of the recovery load but without apparently having any effect on the administrative attitude

The third class of stores were those whose volume depended largely on price appeal This included stores which had to offer prices to attract customers because of downtown locations and stores which were using aggressive price cutting in an effort to make a place for themselves as newcomers to the field during the course of the depression This group included chain stores, department stores, the pine board store in the drug field and the supermarkets in the grocery field All of these types devoted the closest attention to any proposed clauses which were designed to create price appeal by prohibiting sales below purchase cost or some other predetermined level

The result in this direction has been to favor the moderate price cutter as against either the drastic price cutter or the store depending on service appeals While some price protection has been given in the Codes, it is sufficiently moderate

to permit the department store and chain store to sell certain items at prices lower than would normally be offered by the small service retailer The pine boards and supermarkets are barred under the Code from exerting the full force of price cutting which they have used in the past The general effect, therefore, is to restore the general status of competition as far as price appeal is concerned, which existed prior to the depression

The earnings of retailers depend in part on the day to day outcome of the constant struggle between the retailer and his supplier for the larger share of the amount paid by the consumer to cover the functions performed by both The activities of the NRA have thrown the balance slightly in favor of the supplier, particularly in the case of small manufacturers supplying the department stores Here again this could be viewed either as an interference with the present competitive equilibrium or a return to the relative status prior to the depression Over a long period the present policies of NRA would work more and more against the retailers as compared with the supplier There is always, of course, the definite possibility that present policies would be modified before they had led to any drastic upsetting of the present balance of power between retailer and supplier

From the standpoint of the general public interest, the most important question of all is what effect a Recovery Program may have on the total cost of distribution It has long been held by many people that one of the greatest needs of our economic system was to be able to perform at lower cost the function of transferring goods from the hands of the manufacturer to those of the consumer Specifically in connection with the Recovery Program several of the Recovery Agencies and particularly the A A A have placed major stress on reduction of the cost of distribution as one of the fundamental objectives of the program This must be acknowledged as a vital problem and one that must be solved for purposes of long range reconstruction even though its bearing on immediate recovery may be more limited

While such a cost reduction is certainly to be desired, the important question is where to take hold of the problem since it can be shown beyond the question of a doubt that many of the efforts to reduce the cost of distribution have actually tended to increase costs This is sometimes true for example, in the case of individual manufacturers who feel that the cost of the wholesale function as performed by the independent wholesaler is too high to attempt to sell their merchandise directly to the retailer Only too often the manufacturer finds that he is not able to do the job as cheaply as the wholesaler He may still hang on to the wholesale facilities which he has established either because it is difficult to withdraw his investment in them or because he finds some compensating advantage in an increased ability to control his market even though the function is performed at a higher cost

So far as administrative points of view are concerned, the most persistent and fallacious bit of thinking concerning distribution cost has been the assumption that the small retailer was necessarily inefficient because he was small and that he should therefore be eliminated or his numbers greatly reduced To the extent that this point of view is allowed to determine policies, the efforts of reducing the cost of distribution may have an effect opposite to that desired As opposed to this point of view the following things can be definitely shown

1 That the optimum size of unit in retailing is at a very moderate volume point in most lines of trade

2 That the advantages of aggregating individual units into chain systems are advantages which can be duplicated by cooperative effort between small retailers and is not inherent in the corporate form of organization or outstanding excellences of chain management

3 That the function of service retailing cannot be fairly judged except in relation to a definite measure of how much service the consumer wants Retailers create place utility and it is obvious that the cost of creating it will be high if the consumer demands that commodities be brought within a few blocks of his home

4 That the really inefficient small retailers make up a very small fraction of the total volume and that the consumer does not ordinarily carry an additional load because of their presence in the picture since the greater part of the loss which such retailers sustain through excessive operation costs is in the form of wasting their own assets

5 That the small retailer is in several lines engaged in subsidizing the expensive fringe of retail distribution and that a unified system which attempted to cover the market completely might find its average cost considerably increased by the necessity for maintaining distribution at the points where such small retailers now maintain it

---

Gould's 'Pocket Pronouncing Medical Dictionary" 10th edition P Blakiston's Son & Co Inc, Philadelphia Price $2 00, plain, $2 50, with thumb index Flexible cover 4 x 6½ inches Contains over 40,000 words giving the pronunciation and definition of the principal words used in medicine and the collateral sciences, including illustrations of the arteries muscles, nerves bacteria, bacilli micrococci, spirilla, etc , thermometric scales revised dose list of drugs and their incompatibilities, systems of weights and measures based upon U S Pharmacopœia X and revised veterinary dose tables By George M Gould

In selecting the new words care has been taken to include those of sound and permanent value Twelve pages are given to symbols and abbreviations The definitions are brief but definite The Physician's Dose Table' has been prepared by Wilbur L Scoville, included therein the names of Remedies are given in the first column and, in sequence Doses in Apothecaries System, Metric Solubility, Important Incompatibilities The Veterinary Dose Table was prepared by Dr W S Devoe, formerly inspector of Animal Industry U S Department of Agriculture and revised by Dr V G Kimball, assistant professor of Veterinary Medicine, University of Pennsylvania The value of a dictionary is best determined by the users and the revisions and large sale have evidenced the approval of the practitioners of medicine and others who have the volume in their libraries

Pharmaceutical Formulas (P F Vol II) published 1934 supplementary to Vol I, and known as 'The Chemists' Recipe Book' Contains formulas for adhesives beverages, cleaning materials, culinary and household requisites horticultural and agricultural preparations, inks, lozenges, perfumes, photographic preparations, polishes, soaps toilet articles varnishes veterinary preparations etc , including numerous descriptions of practical methods employed in their manufacture and other information of use to pharmacists and manufacturers Over 1000 pages Price by post 15 shillings 6 pence

The formulas are to a large extent representative of the 'correspondence columns" of the *Chemist and Druggist,* the replies to correspondents have been arranged under various headings and the publishers advise that, as far as possible, the formulas have been checked by experiment Formulas from foreign official and non official publications (other than British) are included and, in this connection, it may be pointed out that strengths of preparations and composition of them may vary this should be taken into consideration in compounding also quantities of this book, unless expressed in the Metric System or otherwise stated, are given in British units of weights and measures The *Chemist and Druggist* is well and favorably known to pharmacists and speaks for the value of the Book herein noted

THE CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

MINUTES OF THE SESSIONS HELD IN SHOREHAM HOTEL, WASHINGTON, D C MAY 10 AND 11, 1934

The sixth annual meeting of the Conference of Pharmaceutical Law Enforcement Officials was convened by Chairman R L Swain at 9 30 A M in the Card Room, with the following present Messrs J W Slocum, W F Mead, Iowa, R C Reese, W Mac Childs, Kansas, Hugo Schaefer, George W Mather F C A Schaefer C P Wimmer, New York, Robert C Wilson, W S Elkins, Georgia, A L I Winne, Virginia, J Lester Hayman, G O Young West Virginia C T Gilbert Connecticut, Joseph Burniak, Michigan, J B Pilchard, L L Walton, R R Gaw, Pennsylvania, N N Brakke, North Dakota, Rowland Jones, South Dakota, C S Pierce, B K Murdock, L H Marr, Maine, W C Muesing J P Jellinek, Minnesota, Henry F Hein Texas, P R Loveland, New Jersey, W Bruce Philip, J W Lee, A C Taylor, R A Veitch Washington, D C , F V McCullough, Indiana, Frank C Purdum, W F Reindollar, R L Swain Miss B Olive Cole, Maryland, M N Ford Ohio

Chairman Swain made a verbal address and then called for the report of the Secretary Treasurer

THE REPORT OF SECRETARY-TREASURER

BY M N FORD

Since the last annual meeting of the Conference, the Secretary has had considerable requests from different states for information which was promptly furnished There being no particular court decisions furnished the Secretary, there have been no bulletins sent out since the last meeting Proceedings of the last annual meeting were published in the JOURNAL and it has been recommended by the Chairman that reprints be secured and made available to the Conference members as soon as possible

There have been no expenditures of money since our last annual meeting therefore, we have on hand a balance from the last meeting of $170 67 We have received from Chairman F C A Schaefer, of the Finance Committee $110 00, therefore we have on hand at this time $280 67

Upon motion of Mr Winne seconded by Mr Jones the report of the Secretary Treasurer was approved

The Conference also approved obtaining reprints of the proceedings of the last annual meeting and that they be made available to the members as soon as possible

REPORT OF FINANCE COMMITTEE

The Finance Committee appointed by Chairman Swain sent out an appeal to the Boards of Pharmacy for contributions of ten dollars for the Conference This Committee not having been appointed until recently did not have ample time to get many replies from their appeal, however the Committee did receive $10 00 contributions from the states of Maryland, Ohio Kentucky Connecticut, North Carolina North Dakota, New Jersey, West Virginia Arkansas and Wisconsin and $5 00 contributions from the Board of Pharmacy of Pennsylvania and from the West Virginia State Pharmaceutical Association making a total of $110 00 The Committee has had favorable replies from other states who will forward their contributions a little later

ROWLAND JONES
W MAC CHILDS
WM HANKINS
HUGO SCHAEFER
F C A SCHAEFER, *Chairman*

Upon motion by Mr Mead, seconded by Mr Gilbert, the report of the Committee was approved

A question was raised as to the legality of the fee being paid by the Board of Pharmacy and a discussion was entered into by Messrs Wilson Childs, Winne, Mead and Hayman

At this time Chairman Swain introduced the Hon Herbert Levy of the Maryland Bar who addressed the Conference on the subject of ' The Place of the Attorney-General in the Legislative and Law Enforcement Program ' Mr Levy spoke in part as follows

Some of you may recall that I spoke to this group at its meeting in Baltimore some two or three years ago Since that time laws have been enacted with such bewildering rapidity and of such sweeping effect that an examination of the role of the Attorney General brings to light new possibilities of useful service on the part of the person holding that office In general it should be said that the place of the Attorney General is traditionally at the head of the law enforcement division of government whereas on the other hand he has no place traditionally in the legislative program

The Attorney General of the United States has the duty of representing the government in law suits in the Supreme Court and in the Court of Claims, and in addition is head of the Department of Justice, having as such as Bryce has remarked in his analysis of the American Commonwealth, powers comparable to those of a minister of justice in a European cabinet Further, the Attorney-General has the important duty of advising the President and the heads of executive departments by opinions on questions of law submitted to him Significant is the inability of the Attorney General to render opinions to either of the houses of Congress and equally so is the limitation whereby the Attorney General cannot give opinions except upon questions actually arising in the department requesting the opinions Finally, the Attorney General may at times act as draughtsman of legislation to be proposed in Congress

The actual duty of prosecuting offenders against the federal laws is not performed unless and until the appellate courts are reached But the connection between the district attorneys and the Attorney General gives the Attorney General contact with and responsibility for the prosecution of offenders even in the lower courts The duties of the various State Attorneys General vary in each state

A contrast between the United States Attorney-General and the Attorney General of Maryland, as an example, may be found in the fact that the local States Attorneys are not subject to the control of the Attorney General of the state who can only participate in a prosecution in a lower court when required by the Governor or the General Assembly to aid the States' Attorneys

In summary, therefore of the place of the Attorney General in the law enforcement pro gram it may be said the United States Attorney-General occupies through the district attorneys a most responsible position in this regard whereas the State Attorney-General holds one of much less importance

In the rendering of opinions there is also some contrast to be noted In Maryland for example the Attorney-General may render opinions when required to do so either by the General Assembly or by one of its houses

The rendering of opinions and the analogous duty of drawing proposed legislation may be described as functions midway between law enforcing and actual legislating " A strict construction of existing statutes may for example directly bring about the passage of supplementary acts by the legislature A liberal construction may bring about restrictive legislation by the law-making body Or the injection of some personal point of view in a law being framed for a governmental department may directly affect legislation

The very possibility of influencing the character of legislation by either of these methods raises the interesting question of the separation of powers Needless to say any attempt on the part of the Attorney-General directly to color legislative changes through the use of his services by those charged with legislative duties presents the same problem in a form in which the separation of the governmental powers can be studied as more strikingly productive of good or evil The actual proposing and advocating of particular legislation by an attorney general is so unusual and so unlikely because of the resentment it would cause to legislators that it need only be regarded as the extreme to which this particular combination of governmental functions may ever proceed

'Separation of Powers ' is a phrase familiar to even the most casual student of civics who has heard from school boy days of the division of the government into executive legislative and judicial parts The origin of the phrase appears to go back to the Spirit of Laws" written by the French nobleman Montesquieu in the middle of the Eighteenth Century It has been said of this

versatile writer (whose 'Persian Letters" are known to many not the least interested in government) that his gift of generalization was so happy that from a mass of incomplete or even totally inaccurate information he could extract a principle of the widest application With his other great gift of forceful and epigrammatic expression he could then express the principle in terms of terse lucidity

At the time when he was writing, the Hanoverian monarchs of England had been on the throne only a few years And the cabinet system of government, made necessary by their inability to speak English and their ignorance of English affairs, to say nothing of their frequent absences on visits to their German kingdom, was only slightly known to Europeans But the division of the government already definitely marked was not lost on Montesquieu when he analyzed the British constitution It is in this analysis that he uses the phrase "Separation of Powers " And he there says

> When the legislative and executive powers are united in the same person or in the same body of magistrates, there can be no liberty "

The idea had already come to America and was embodied in most of the state constitutions at the time of the drawing of the Federal constitution But the words of Montesquieu, quoted by Madison in the *Federalist*, kept the principle clear in the minds of the members of the constitutional convention

It may be appropriate to notice that Madison particularly comments upon the force of the statement of the principle in Article 8 of the Maryland Declaration of Rights

> That the Legislative, Executive and Judicial powers of Government ought to be forever separate and distinct from each other, and no person exercising the functions of one of said Departments shall assume or discharge the duties of any other "

Interesting as may be the study of the origin of the idea it is still more interesting to observe with what force the principle has been adhered to through all the successive changes both in Federal and state forms of government

Applied to the activities of the Attorney-General as a member of the executive department of the government it obviously prevents his voting in any legislative body as does the Attorney General of England who is a member of Parliament It also prevents any close official connection with the law-making power

His problem is not to influence the legislature I learned from practical experience that legislators are very jealous of their prerogatives A wise Attorney-General should never show too much zeal in advocating departmental legislation, for immediately he does so he is suspected of attempting to encroach upon the legislative domain

He should thoroughly familiarize himself with the governmental problems to be dealt with so that if called upon he can draft the laws in clear and succinct language and then present to such as may inquire the explanations and reasons for the law Beyond this he cannot go except at the peril of his official client's cause

That does not mean his legislative activities are of no value in influencing the passage or defeat of legislation in which his official clients are interested On the contrary, a dignified semi judicial presentation of the arguments in favor of the department's position usually carries considerably more weight than an argument to like effect made directly by the official involved

Those of you who must resort to legislatures in connection with your work take heed

Use your Attorney General He can be of great help to you in the presentation of your case, but do not make too much use of him

In other words, enforcement work, like every other kind of work in life must be administered with common sense and the Attorney General can be of great help if you take his nose out of the law books and fully familiarize him with your problem from a practical point of view

The lofty impartiality of the Attorney General, who best fulfils his duties, derived as it is from principles long studied and understood finds no more useful function than in connection with the governmental changes of to day

Acting because of the critical condition of the country in the spring of 1933 Congress passed a series of extraordinary measures producing the most wide spread effects, yet *short and simple* in

their language The most frequently discussed of these are the NRA, and the AAA The power which these acts placed in the hands of individuals is almost incredible The ability of individuals to vary the meaning of the law by executive orders has given practically law making power to executives charged with the administration of these and numerous other acts A committee on administrative law appointed by the American Bar Association says in its report, "To a greater extent than ever before, the lawyer must look to the President's executive orders and to the releases and announcements of the several administrative agencies for accurate and up to-date knowledge of the existing state of the law '

With no disposition whatever to criticize the bold and comprehensive program of President Roosevelt which has breathed life into an industrial civilization previously believed by many to be dying, and has truly replaced the despair of almost an entire world with hope, it seems the effect of concentration of power in administrative officials is bound to tend at least to a desire for increased power on the part of state and Federal officials generally

The proposed Copeland-Tugwell Bill, with which, I believe, you gentlemen have some familiarity, is drawn with the highest purposes in mind to protect the public health But here, too, extraordinary powers are proposed to be given to individuals

The Secretary of State may promulgate regulations governing conditions of manufacture, processing or packing, and he may in effect close a factory and then decide whether his action was justified Meanwhile at all times any officer or employee duly designated by the Secretary shall have access to inspect any factory of the group described

It is apparent that interpretations of this Act, which determine its ultimate scope, will vitally affect the thousands of manufacturers subject to its terms The many questions which will arise in the minds of the army of enforcing officials will call for opinions from the Attorney-General's office, which will react upon every member of the pharmaceutical profession Wise opinions by an Attorney General aware of the problems sought to be solved by the Bill, and not attempting to extend the already far extended confines of the law, will do much to carry out the beneficent purpose of the Act while safeguarding the rights of the individual

The Attorney General who understands the problems of government, well serves those whom he represents by impartially giving opinions to department heads to keep them within their scope and assist them in the execution of the powers that they have been given by the legislature, and by accurately reflecting in bills prepared by him the views of the legislative officials whom he assists

If the new type of legislation such as that recently passed, is to be permanent, the Attorney-General can do much to make the change in governmental theory less unpalatable by bringing about through his counsel and advice, tact and discretion in administration

Following Mr Levy's address, he submitted to questions from the Conference, after which he was given a rising vote of thanks for his splendid address

Chairman Swain next called upon George W Mather, secretary of the New York Board of Pharmacy, who presented a paper on ' The Enforcement of the Poison Laws " Before submitting his paper, Mr Mather gave a verbal report of his activities which were discussed by Messrs Childs Wilson Purdum Winne Reese Jones Elkins, Gilbert Walton and Swain

ENFORCEMENT OF THE NEW YORK STATE POISON LAWS

As early as 1880 the State of New York placed upon the statute books a limited type of control which surrounded the sale of medicines regarded as poisonous This law was amended several times and in 1910 enforcement of the Pharmacy Law was placed under the Department of Education of the State of New York

At that time the word "poison" was defined as follows

"Poisons, where not otherwise limited, means any drugs, chemical, medicine or preparation liable to be destructive to adult human life in quantities of sixty grains or less "

The New York State Board of Pharmacy functioning under the Department was by law given the power to regulate the practice of pharmacology and to make rules approved by the Department for the supervision over the sale of drugs and medicines In conformity with that law certain schedules known as 'A" and 'B ' were adopted

Schedule 'A" consisted of the articles listed below "Schedule A Arsenic, atropine, corrosive sublimate potassium cyanide chloral hydrate, hydrocyanic acid morphine, strychnine

and all other poisonous vegetable alkaloids, and their salts, oil of bitter almond containing hydrocyanic acid, opium and its preparations, except paregoric and such others as contain less than two grains of opium to the ounce "

Schedule ' B" consisted of the following

"Schedule B Aconite belladonna, cantharides, colchicum, conium, cotton root, digitalis, ergot, hellebore, henbane phytolacca, strophantus, oil of savin, oil of tansy, veratrum, viride and their pharmaceutical preparations arsenical solution, carbolic acid chloroform, creosote, croton oil, white precipitate methyl or wood alcohol mineral acids, oxalic acid, Paris green salts of lead salts of zinc or any drug, chemical or preparation which is destructive to adult human life in quantities of sixty grains or less "

Each item of medicine which was defined as poison by reason of the rule is required by law to have the name of the article and the place of the seller noted on the package or container and the label shall be printed in red ink

Violations for infractions of the above laws are punishable as a misdemeanor and may carry a penalty ranging from $25 00 to $200 00 for each offense

"1 1360 Poison schedules, register It is unlawful for any person to sell at retail or to furnish any of the poisons of schedules A and B without affixing or causing to be affixed to the bottle, box, vessel or package a label with the name of the article and word poison distinctly shown and with the name and place of business of the seller all printed in red ink together with the name of such poisons printed or written thereupon in plain legible characters

"2 Wholesale dealers in drugs medicines, pharmaceutical preparations chemicals or poisons shall affix or cause to be affixed to every bottle, box, parcel and outer inclosure of any original package containing any of the articles of schedule A, a suitable label or brand in red ink with the word poison upon it

' 3 Register Every person who disposes of or sells at retail or furnishes any poisons included in schedule A shall before delivering the same enter in a book kept for that purpose the date of sale the name and address of the purchaser and the name and quantity of the poison, the purpose for which it is purchased and the name of the dispenser The poison register must be always open for inspection by the proper authorities and must be preserved for at least five years after the last entry He shall not deliver any of the poisons of schedules A or B until he has satisfied himself that the purchaser is aware of the poisonous character and that the poison is to be used for a legitimate purpose The provisions of the paragraph do not apply to the dispensing of medicines or poisons on physicians' prescriptions '

The labeling of poisons also applies to proprietary remedies if they come within the scope of the rule

Section 1354 provides as follows Every place in which drugs chemicals medicines, prescriptions or poisons are retailed or dispensed or compounded shall be a pharmacy, a drug store or a store shall be under the personal supervision of a pharmacist, a druggist or a store keeper and shall be annually registered in the month of January by the board as conducted in full compliance with law and the rules "

Prior to April 19 1934 the control of the manufacture and sale of proprietary remedies were not within the jurisdiction of the New York Board of Pharmacy However on that date this section was amended placing under the supervision and control of the New York State Board of Pharmacy the manufacture and sale of articles which are poisonous

It is anticipated that in the near future the Board of Pharmacy will formulate rules with the sanction of the Department for the control of proprietary remedies which will conform to the above amendment

Chairman Swain next introduced **Frank C Purdum** a member of the Maryland State Legislature who presented a paper "Is Pharmaceutical Legislation Best Served by a Pharmacist Member of the Legislature? ' as follows

IS PHARMACEUTICAL LEGISLATION BEST SERVED BY A PHARMACIST MEMBER OF THE LEGISLATURE?

The Chairman has assigned to me a rather unusual subject However, I think it is an important one and am very glad to contribute what I can to this Conference of Law Enforcement

Officials At the same time, I am aware of the fact that, unless I can tell you something you do not already know this paper will be of very little value

I shall cover, as briefly as possible, my outstanding experiences and impressions, particularly in connection with pharmacy while serving as a member of the Maryland Legislature during the past eight years I am a graduate in pharmacy, have been registered in Maryland for thirty-two years, and have been and am now, engaged in the operation of my own drug store

The question is Is pharmaceutical legislation best served by a pharmacist member of the legislature? This subject immediately suggests other questions For instance, assuming for the moment that it is to the advantage of the profession to have a pharmacist in the law-making bodies, what type of pharmacist should be encouraged and sponsored by the profession to enter the field of politics? Can a clean, high class professional pharmacist seek an elective office without sacrificing some of his ideals? In what way can a pharmacist as a member of the legislative body, be of most service to the profession of pharmacy?

The question has been raised as to whether he should take the leadership as a trained professional man, and introduce and sponsor all bills that the pharmacists may desire, be ready to boldly take the floor in opposition to all unfavorable legislation or whether he should somewhat submerge himself and work in the background through well selected leaders

Obviously, this question, presenting both views of so large and important a matter, might be discussed at great length The mere statement of the question indicates that there are advantages on both sides Certainly, all efforts must be taken to disarm the criticism that when you, a pharmacist, introduce and sponsor legislation in the interests of pharmacy, you are largely concerned in a selfish venture However, a discussion of what place the pharmacist should play is largely theoretical because his interest and influence are certain to become known whether he acts as a principal or as an accessory, so to speak

As I see the whole matter there can be no fixed rules in this respect It depends upon the circumstances and the character of the legislation being considered If it is of rather a technical nature such as is embraced in the adoption of experience and educational standards, or in bills dealing with specific chemical or pharmaceutical terms, undoubtedly the pharmacist should be thoroughly familiar with the subject and be prepared to explain and answer intelligently any questions that may arise In such a case, there is every reason why he should be the leader in favoring or opposing the measure Here he is on solid ground, and should be regarded as the best qualified to express an expert view of all the facts involved

If on the other hand, the legislation is more economic than technical, the pharmacist legislator may better serve by keeping in the background This thought can be made clear by considering a bill designed to restrict the sale of household remedies to registered pharmacists In spite of our firm belief that such a bill has a direct bearing upon public health, the average legislator is certain to regard it as a mere selfish effort to give pharmacists a monopoly of the business In such a case real statesmanship is demanded, and, even with the best laid plans the thing is mighty apt to get into a snarl and possibly result in defeat, or a compromise measure just about as bad

The pharmacist members of the legislature should seek a place upon the committee to which all health bills are referred In Maryland this committee is known as the Committee on Sanitation and Hygiene I have been chairman of this committee for some years The mere fact that I was selected for this important position carries with it the recognition that my training and experience, as a pharmacist, will have a direct bearing upon the matters which automatically are referred to this committee Here the pharmacist sits in a strategic position He is really on the inside He hears both sides of the question attends all committee hearings may cross examine those for or against a measure, and may present his professional and technical views to the committee He is in position to see to it that a proper report is made by the committee, and he has all the facts should it be necessary to discuss the bill on the floor In every instance, I strongly urge pharmacist legislators to be members of the committee to which pharmaceutical and health legislation is referred

The right type of pharmacist can so impress himself on his colleagues that his judgment will count heavily They begin to regard him as the best posted man in certain respects More or less subconsciously they look to him when certain questions come up With this so I have found, comes a heavy responsibility Members of the legislature have frequently told me that I should

take the responsibility in matters dealing with pharmacy and other health legislation They feel that this is my line, and just as frankly, not theirs Unless the matter is highly controversial, I have found a strong disposition to make me take the lead in legislation affecting the whole health field

Recently, a bill was introduced in the State Senate, which would have granted registration as a pharmacist to one who was entitled to register in 1902, simply by filing the required affidavits, but who was not in the State at the designated period On the surface the bill was harmless and was designed to serve a really deserving case However, such an act would have established a precedent which could have been, and probably would have been, very troublesome There was no disposition to take any action on the bill until my views had been obtained Even though I am a member of the House, the Senate wanted my views on a matter directly concerning pharmacy I mention this incident simply to illustrate the point that a pharmacist in the legislature finds himself in position of speaking for the profession, and in a position also, to further its general standing not only in a legislative sense, but in matters dealing with its professional and technical service

Again, when the Maryland Legislature was considering the provisions of an act to regulate the sale and distribution of alcoholic liquors, I was able to convince the body that alcohol used exclusively for the manufacture of medicinal toilet and antiseptic preparations, flavoring extracts and other preparations unfit for beverage purposes should not carry any state excise tax Also that whisky and other intoxicants when dispensed on physicians' prescriptions were medicines and thus the pharmacist should not be required to take out any State liquor license to fill such prescriptions Let it be understood that this was not a personal victory I was there, a pharmacist who understood the problems and who was on the ground floor, so to speak, throughout the whole discussion

Let me emphasize a point that is of the greatest importance While I am fully convinced that a pharmacist as a member of the legislature can be of very great aid in furthering the legislative program of the profession, I am just as convinced that he must be given real backing by the group as a whole I have constantly sought to have the endorsement and active support of the state associations the board of pharmacy and other organized groups Perhaps it would be more accurate to say that I have tried to have passed, bills which organized pharmacy has sponsored and approved I have more nearly regarded myself simply as their spokesman

If some dangerous, or even debatable, bill is introduced by others than our own group, having a bearing upon pharmacists, I have invariably called it to the attention of the pharmaceutical leaders in the state, and we have sat down and talked it over The course of action that I have then followed has been in accord with the conclusion reached by the group Up to the present, we have had no family quarrels or dissensions and we will have none, so long as the proper men lead and so long as there is the proper team work between them and the pharmacist member of the Legislature However, let me emphasize it is team work that is required If our own ranks develop opposing camps if we once let it be known that the group cannot agree among themselves, the legislative program may as well be shelved until we can express a collective opinion and stand squarely behind it

In conclusion, let me digress briefly into a discussion of practical politics Legislative experience and the ability to fraternize with other members of the legislature are really great helps Every member has a few bills in which he is especially interested Now, I have always felt that it was wise to introduce legislation early in the session, put a real kick back of it and get it through By so doing, you escape the pitfalls of trading and dealing once the battle is really on Most representatives are partly or wholly controlled by district leaders or bosses as they are generally called These bosses are not always bad and their friendship is worth cultivating It may only cost a cigar, highball or lunch The most successful lobbyists work through these channels. This does not show up in pharmaceutical legislation bearing upon the educational or professional sides Invariably, however once it becomes economic or smacking of monopoly you will find the "big boys" want to know what it is all about

Another thing, pharmacists as a whole do not show sufficient interest in politics It is my belief that, in the final analysis, we get as good government as we deserve The best citizens of any state or municipality should be sufficiently interested in politics to assure good government The pharmacist, being both a professional and business man, has a splendid opportunity, in his

daily contact with people, to have a say as to whom his representatives should be But is he interested? To be more explicit, we should take time to become interested in issues, we should vote in primary elections, we should seek to learn the candidate's views while he is still a candidate, in every possible way consistent with decency and civic standards, we should seek to have our voices heard and our views considered

During recent years, any number of bills have come before the Legislature having a bearing upon public health or upon some public health profession Anti vivisection bill is a regular and biennial affair, bills favorable and unfavorable to pharmacists, bills seeking to permit Christian Science or faith healers to make a charge for their services, enlarging the scope of osteopaths and chiropractors, conferring the right of optometrists to use the title 'doctor," uniform state narcotic act, these and many more have found their way to the Legislature during my terms of office

It is my opinion regardless of the unsavory reputation of professional politicians, that a pharmacist can serve as a member of a legislative body without compromising his character or reputation It is my opinion too that a pharmacist, as a member of the Legislature is in position to greatly advance pharmaceutical legislation In most cases he should take a leading courageous and frank position If he is the proper type of pharmacist his views will count heavily on all matters pertaining to the pharmaceutical profession and the drug business

P L Loveland of New Jersey took the place of Harry E Bischoff on the program and spoke on the same subject as Mr Purdum

At this time Chairman Swain appointed the following Committee on Nominations *Chairman* A L I Winne, Virginia, Hugo Schaeffer, New York, L L Walton, Pennsylvania

The following Committee on Resolutions was appointed *Chairman*, J Lester Hayman West Virginia, W S Elkins, Georgia, Roy Reese, Kansas

Chairman Swain next called upon W Mac Childs, secretary of the Kansas Board of Pharmacy who made an oral address on the subject of the "Public Health Council of Kansas and the Values of Its Principles to the Pharmaceutical Program "

At 12 45 P M upon motion duly seconded, the Conference adjourned

Thursday, May 10th

At 8 00 P M the Conference met in joint session with the Section on Education and Legislation and Conference of Pharmaceutical Association Secretaries, in the Club Room of the Hotel Shoreham

SECOND SESSION.

The Second Session of the Conference of Pharmaceutical Law Enforcement Officials convened at 2 30 P M , Friday May 11th, in the Grill Room of the Shoreham Hotel

Chairman Swain called the meeting to order and the first order of business was the discussion to collect court decisions with the idea of raising sufficient revenue to have same printed for distribution to members of the Conference Both Mr Mead of Iowa and Mr Elkins of Georgia volunteered a subscription up to twenty five dollars each in support of such a program either through the board or association

The next question discussed was the time of meeting of the Conference as many of those interested in the Conference meeting would like very much to have a meeting scheduled immediately after the National Association Boards of Pharmacy conclude their sessions The chairman and secretary were directed to use their influence to have such an arrangement made

Chairman Swain next called upon A L I Winne of Virginia, who presented a paper on "Report of Special Committee to Define the Terms 'Patent Medicine' and 'Proprietary Medicine,'" as follows

REPORT OF THE COMMITTEE ON DEFINITION OF "PATENT MEDICINE" AND 'PROPRIETARY MEDICINE "

Your appointed committee to report on a study of adequate definitions for the terms "Patent Medicine" and "Proprietary Medicine" is unfortunately able at this time to render but a superficial report The chairman of the committee acquainted the membership with the purpose of the study and received an informative response from one other member The secretaries of all State Boards of Pharmacy were communicated with and information was returned by some thirty-

eight states Of this number, thirty states reported as having no definition for the terms "Patent Medicine" and "Proprietary Medicine," although the terms were embodied in the pharmacy laws of the respective states Several states have attempted to have the terms defined by their Attorney Generals and some several have court decisions with rather vague interpretations of the terms In no instance is there a clean-cut and satisfactory definition of the terms

The states which report as having no definitions whatever are

Alabama	Kansas	Oregon
Arizona	Kentucky	Pennsylvania
Delaware	Montana	Rhode Island
District of Columbia	Nebraska	South Carolina
Florida	New Jersey	Tennessee
Georgia	New Mexico	Texas
Idaho	North Carolina	Vermont
Illinois	North Dakota	West Virginia
Indiana	Ohio	Wisconsin
Iowa	Oklahoma	Wyoming

Communications directed to the United States Patent Office in Washington brought no response in the shape of a definition of either the term "Patent Medicine" or the term "Proprietary Medicine "

The State of Connecticut, while not expressly defining the terms "Patent and Proprietary Medicines," does throw some precautions around the selling of what is termed in the law "Proprietary and Patent and Medicinal Compound," but stipulates that such preparations must be put up separately in sealed containers and labeled and accompanied with directions for use, together with the name and address of the manufacturer or distributor

Maine defines a "Proprietary Medicine" as one which certain individuals, firms, associations or corporations have the exclusive right to manufacture or sell

New Hampshire defines the term ' Proprietary Article" to mean any chemical drug or similar preparation used in the treatment of diseases, if such article is protected against free competition as to name, product, composition or process of manufacture, by secrecy, patent or copy right, or by any other means

While New Jersey used the terms "Patent and Proprietary Medicines" in its law, it does not define the terms but the suggestion is made in a communication from New Jersey that the report of the Commission on Proprietary Medicine of the AMERICAN PHARMACEUTICAL ASSOCIATION be checked up for definitions Your committee has not consulted this report and is therefore unable to embody in the present report the information that might be derived from that source

New York reports that this problem has been given attention by the New York State Board of Pharmacy and after considerable thought the determination reached by that board was that a Proprietary Medicine is a medicine that any person or persons have the exclusive right to manufacture or sell

South Dakota defines the term as follows "For the purpose of this Act, patent or proprietary medicines shall be considered to include any medicine or drug which is prepared or compounded in proprietary form and sold at retail in the original packages and where the sale thereof is unregulated under the laws of the state "

Virginia attempts to define the terms as follows "The term patent or proprietary medicines, as used in this chapter, shall include only medicines prepared according to a private formula or a secret process or under a trade-mark of the manufacturer or owner and sold under a trade name in an original package on which appear the disease or diseases for which the medicine is intended to be used and specific directions for its administration "

It will be observed that in the few instances where there has been an attempt made to define the terms as embodied in the laws the definitions are deplorably inadequate to control the situation which exists in most states It would appear, therefore, that a further study of this subject should be made In all instances where there has been an effort to define the terms the definitions have failed to differentiate between that large class of products commonly regarded in the drug trade as classifiable under the term "Patent Medicine" from that other large and ever increasing group known to the drug trade as "Proprietary" products The result is that in most states merchants

who know nothing of pharmacy are able to stock and sell many dangerous and potent proprietary products, and we believe that the public interest is not sufficiently safeguarded under such an arrangement

While the definition in the Virginia law is largely inadequate and has been criticized as out of line with the Federal Pure Food and Drugs Act, it does at least have the merit of precluding the sale by general merchants of such proprietary products as do not have designated on their labels the disease or diseases for which the products are intended to be used Such a provision in state law, while entirely out of line with the thoughts of many of those who are interested in an adequate Federal Act to control the sale of products for self medication, may be useful until some better solution of the problem is suggested

It seems to me that the situation would require a clean-cut definition for that group of remedies offered to the public for self administration, and which we have loosely designated as Patent Medicines, and another clean cut definition to embrace that group of proprietary products carried in drug stocks ostensibly for the filling of physicians' prescriptions, and commonly referred to as proprietary products In other words these two groups should be segregated, clearly designated by adequate definitions and the suggestion then made to the several states for a revision of their state pharmacy laws in such a manner as to permit, if desired, the sale of patent medicines by general merchants and to prohibit the sale of proprietary products by that group

It is common knowledge that the term "Patent Medicine" is a misnomer Few of these remedies are protected by patents Some are registered and some are protected by copyright and trade mark, but these forms of protection are indiscriminately used in the patent medicine field and in the proprietary medicine field

It is undoubtedly true that many dangerous proprietary products are stocked and sold by general merchants when as a matter of common protection of the consuming public, these products should be distributed only by pharmacists upon physicians' prescriptions The situation is one which we believe worthy of further study and this inadequate report is presented with the hope that the questions will be placed in the hands of a competent committee for further study and a more definite and constructive recommendation

Respectfully submitted,

GEO W MATHER, New York
JOHN M WOODSIDE, Pennsylvania
M N FORD, Ohio
R P FISCHELIS, New Jersey
R L SWAIN, Maryland
A L I WINNE, *Chairman*, Virginia

Subsequent to the making up of the above report, the following letter was received from Secretary Baker of the Colorado Board of Pharmacy

Mr A L I Winne Secretary
Virginia Board of Pharmacy
105 State Office Building
Richmond, Virginia

Denver, Colo
April 30, 1934

Dear Mr Winne

Replying to your letter of the 18th, I wish to advise that our Board of Pharmacy has defined 'Patent" and 'Proprietary ' medicines, as follows

"A patent medicine is one the formula of which is registered in the United States Patent Office at Washington, D C which registration protects the inventor of the formula from duplication by any other or manufacturing company "

"A proprietary medicine is a medicine compounded according to a formula known only to the manufacturer and marketed under a trade name This trade name does not necessarily have to be registered under the United States Trade Mark Laws, as common law trade-marks exist in the United States and a suit for infringement of a trade mark may be brought by the original user thereof even though the original user may never have registered the same '

The exemption of proprietary medicines in our Pharmacy Law does not apply to official preparations listed in the United States Pharmacopœia and the National Formulary which are sold under a proprietary name

Very truly yours,
(Signed) ARTHUR D BAKER *Secretary*

At the conclusion of Mr Winne's paper a motion was made and adopted, whereby a committee on Patent and Proprietary Medicines was ordered continued, and the report adopted

Chairman Swain next reported that W S Frisbie of the United States Department of Agriculture could not be present and if he submitted a paper on "Cooperation between Federal and State Officials in the Enforcement of the Food and Drugs Acts," such paper will be published

Chairman Swain next referred to a paper submitted by William F Reindollar of the Bureau of Chemistry, Maryland State Department of Health on "Relationship of the Control Laboratory to Enforcement under the Food and Drugs Act," as follows

RELATIONSHIP OF THE CONTROL LABORATORY TO ENFORCEMENT UNDER THE FOOD AND DRUGS ACT

There is perhaps no phase of the enforcement of the Food and Drugs Act more fundamental than that involving the collection, inspection and examination of those products which are offered for sale within the scope of the Act The very purpose of defining the terms "adulteration" and "misbranding," the very act of creating standards of purity, quality and strength, presuppose the existence of an agency, capable and qualified, to make analyses of the products in question and to pass critical judgment upon them with respect to these provisions Hence the necessity of an adequate control laboratory as an integral cog in the machinery of law enforcement is a well established and unquestioned fact The presence of such units in the organizations of the several Municipal and State Health Departments, in addition to those of the Federal Government, is but another confirmation of their value

The details of the operations of the Control Laboratory and the history of the "official sample" in its course of travel from vendor to analyst form an engaging narrative to those whose interests lie in this field It is the purpose of this article to outline briefly the procedures adopted to assure the integrity and safeguard the identity of the official sample, and to do this in such a manner that neither jury nor defending attorney may harbor doubts regarding its genuineness or its relation to the vendor

Purchases of foods and drug products offered for sale on the open market are made in most cases direct from the wholesaler or retailer by an inspector who is an agent of the Control Commissioner No effort is made upon the part of this individual either to conceal or reveal his identity, or upon questioning to hide the purpose for which his purchase is being made However, unless previous circumstances indicate a probable prosecution or unless the vendor so requests, the sample are not sealed on the premises The inspector makes notes concerning the places which he visits and when necessary puts an identifying mark on containers, this together with the labels on the package serves to identify the samples for him when he seals them at the end of the day There is much to be said pro and con regarding this procedure While in the past it was the custom to seal the sample in the presence of the vendor and although from the legal point of view, this is perhaps the more sound method, because of many disadvantages arising therefrom, it has been discontinued To begin with it is time consuming, it involves the transportation of extra equipment and what is more important, it frequently creates an unfavorable impression upon the customers of the vendor, who enter and see a government agent engaged in collecting and sealing samples Harmless though it may be, an unpleasant interpretation is usually placed upon it Furthermore this procedure does not materially safeguard the identity of the sample, it is rather a challenge to the integrity of the inspector, and a device which is useless in any event if that integrity be lacking

Inspectors are furnished with locked compartments, accessible only to themselves, wherein they may store their samples until they are ready to be delivered to the laboratory After an inspection of their labels by the Commissioner the samples are sealed by pasting a strip label over the stopper or lid of the container This label bears on it, in ink the date, name of inspector and

an identification or seal number To further identify the specimen another sticker bearing this same I R No (Inspector's Record Number) is attached This I R No corresponds to a numbered sheet in the inspector's record book on which is a complete description of information pertinent to the sample, such as name and address of vendor, time and price of purchase, proprietor of establishment, etc The inspector then delivers his samples to the analyst who checks them against the records and signs for the number that he has received

Once in the laboratory the samples are kept under lock and key until an examination can be made at which time the seal is broken by the analyst As the nature of the specimens usually varies, analytical precedence is given to those that are most unstable Hence, a group of volatile spirits would be examined before a group of stable alkaloidal tinctures of the Nux Vomica or Belladonna type In the case of extremely perishable products, such as spirit of ethyl nitrite, facilities of refrigeration are available and employed

The great majority of the drug samples collected represent chemicals or galenicals official in the U S P and N F , simple prescriptions and those many common preparations that are prepared extemporaneously in the pharmacy In addition to these groups and when circumstances warrant, a few proprietary preparations and cosmetics are samples Those preparations which are official are examined by the official assay when one is given if there be none, other standard methods such as those recommended by the Association of Official Agricultural Chemists, or those worked out in the Control Laboratories are employed Simple chemicals are subjected to the tests for purity and identity recommended for them in the official books

Extemporaneous preparations and prescriptions form an interesting group because they constitute an index of the accuracy and skill of the compounder and are more reliable in this respect than galenicals which in many cases are purchased from the manufacturer Capsules of acetphenetidin, quinine or salol percentage solutions of potassium iodide permanganate or argyrol, mixtures of sodium bicarbonate with the bromides and solutions of phenol in oil, are examples of this type which may be purchased with or without a prescription Investigational work of this nature resulted in some rather depressing discoveries at first, but more lately has been compensated for by marked improvement in the majority of cases In an early group of ten samples of Saturated Solution of Potassium Iodide, which should contain between 97 Gm and 103 Gm potassium iodide per 100 cc the values were found to range from 45 Gm –88 Gm , now it is rarely that an illegal sample of this type is met with Mixtures as a rule, have been found to be more carefully compounded when ordered on a prescription than when the same combination is requested orally There are occasional exceptions, however Recently, a prescription calling for one dram of phenol in four ounces of olive oil was purchased and upon examination was found to contain liquefied phenol and cottonseed oil In this case both of the ingredients had been substituted

The Food and Drug Law of Maryland does not include the Shirley Amendment, neither does it provide for the control of cosmetics, hence not many patent medicines nor beautifiers are collected However, the few that have been examined emphasize the need of such legislation Bay Rum containing a substantial percentage of methanol has been encountered on the market Two types of medical crystals sold at exorbitant prices have been shown to consist essentially of sodium sulphate or Glauber's Salt A large quantity of mercury was present in a bleach cream which was purchased because a woman had been severely burned by using it A compound purporting to be of value in the treatment of obesity was found to be essentially dextrose Turpentine made up eighty per cent of the volume of a pneumonia cure This sample was purchased by a housewife from an unknown peddler who appeared at her door one day, informed her he was a physician and assured her that his medicine has cured the most severe cases of pneumonia " Although the lady did not have pneumonia she applied the medicine and acquired second degree burns over a considerable portion of her thorax The physician did not return

Medicines for colds coughs lung fever tuberculosis and all pulmonary complaints canker, scurvy, all diseases arising from uric acid, gastritis, constipation, cramps of the motor nerves liver kidney and bladder troubles pains in the breast and over the heart, all blood diseases, neuralgia neuritis of the spleen, and swollen joints have from time to time been received While in most cases they cure, in some the label modestly limits itself to the words "will relieve " And yet unless the labels contain misstatements regarding the composition of the contents, little progress can be made in the prosecution of their vendors Therapeutic claims are beyond the pale of food and drug legislation in Maryland

Upon completion of the analysis duplicate records are prepared, one of which remains in the permanent files of the Bureau of Chemistry, the other is forwarded to the Commissioner If the sample is legal it is "passed," that is, the records are filed and the sample destroyed The office of the Commissioner contains in addition to a 'daily purchase file," a complete record of products obtained from any one vendor By this means the ' sample history" of any establish ment may be obtained immediately If, however, the sample fails to meet the standards of purity, quality and strength, laid down for it the seller is notified of the fact and summoned to appear and is thus 'afforded an opportunity to present evidence either oral or written, in person or by attor ney, showing any fault or error in the findings of the analyst or examiner, or establishing a guaranty from a party residing in this state" from whom he purchased the goods The analyst is frequently requested to attend these hearings in order to answer technical questions pertaining to the analysis

Should the case under consideration represent a wilful or flagrant violation of the law, the Commissioner may present the evidence to the Board of Health and request a prosecution of the offending party Upon the sanction of that body a complete transcript of the case is forwarded to the State's Attorney and a criminal prosecution is initiated Here begins one of the most im portant phases of the chemist's work It is his duty to appear in court, to testify for the control agency and if necessary, to defend his analyst against opposing experts The necessity of the appearance of the chemist in person was emphasized recently in a case held in Western Maryland This case involved the selling of a poison, mercuric chloride, without observing the regulations pertaining to the registration of such products The chemist did not appear at this case, he sent the analytical sheet instead The defendant's lawyer admitted the sale but demurred at the introduction of the analytical sheet The judge sustained the objections, holding that in spite of the official nature of the document the analyst should have been present in person to present his testimony The barring of this evidence left the state unable to identify the substance as mer curic chloride and the case was lost

Thus it may be seen that the role of the Control Laboratory and its staff in the enforcement of the Food and Drugs Act is both fundamental and necessary However, this work is not limited to the important functions described above The staff of the Chemical Bureau engages in numer ous researches which have for their purposes the development of new and better assay methods Studies on preservation have been made to ascertain the optimum condition under which certain galenicals may be kept An extensive investigation of this nature is being carried out at the pres ent time with hydrogen peroxide Samples are kept under varying conditions of temperature and sunlight and in different types of containers and their rate of deterioration is recorded Another activity has been a statistical study of the weights of content of capsules and of powders with the hopes of establishing tolerances for preparations of this type

In short, the efforts of the Control Laboratory are directed along two channels (*a*) It aids by chemical analysis and court testimony in the enforcement of the law, (*b*) it endeavors by re search to produce information, the utilization of which may make it easier for the manufacturer to produce legitimate products

At this time A L I Winne, chairman of the Committee on Nominations, made the following report For *Chairman*, R L Swain of Maryland, for *Secretary-Treasurer*, M N Ford of Ohio, *Delegate to the House of Delegates* Joseph P Murray of Colorado

Upon motion of Mr Elkins, seconded by Mr King, the report of the Committee on Nomi nations was accepted

Chairman Schaefer of the Finance Committee made a further report at this time and reported that his Committee had decided to continue their request to individual board members in case the board had not contributed before and ask for any amount that they could contribute Upon motion of Mr King seconded by Mr Jones the Committee was ordered continued

Chairman Swain next reported the different opinions rendered by Attorney Generals in regard to pharmaceutical law enforcement and it was the request of the Conference that copies of these opinions be mimeographed and furnished to the members

Chairman Swain advised the Conference that it was his idea to secure from all state boards, blanks and enforcement records in order that they may be used in helping other states that may inquire for such assistance

Upon motion duly seconded, the Conference then adjourned

R L SWAIN, *Chairman* M N FORD, *Secretary Treasurer*

JOINT SESSION OF THE SECTION ON EDUCATION AND LEGISLATION, A PH A., CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS AND CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

ABSTRACT OF THE MINUTES HELD IN WASHINGTON D C, MAY 10, 1934

The meeting of the Section on Education and Legislation, A PH A, Conference of Pharmaceutical Law Enforcement Officials, and Conference of Pharmaceutical Association Secretaries, convened May 10th, at 8 00 P M The meeting was called to order by Chairman George C Schicks

The chairman stated that no regular program had been prepared, so it will be in order to bring up matters relating to work being done and contemplated in the different states

A L I Winne was of the opinion that this was an opportune time to bring up matters along the line suggested for discussion

J Lester Hayman said the West Virginia Legislature had been in session for nearly a year He referred to the sale of medicinal liquors in West Virginia that now these could only be obtained on a physician's prescription

As far as he was informed West Virginia is the only state having a law which demands that the sales tax be passed on to the consumer Sales under five cents are exempted, up to fifty cents a one cent tax obtains, and to one dollar, 2 cents The law went into effect April 1st and indications are that the tax amounts to from 2½ to 4 per cent on the gross sales

Questions were asked relative to the collection of the tax Mr Hayman replied, that the tax is considered a 2 per cent tax, that in making sales the money for the tax is dropped in a box for the purpose, a monthly report must be made

Mr Winne inquired whether there was evasion and whether many merchants did not base their reports on a 2 per cent tax

Such possibilities were admitted by Mr Hayman

Various other means of evasion were brought out by Messrs Adams, Winne and Costello and the question was asked whether a person could make a small purchase and later, make another and have the lower sales tax apply to the combined sales Mr Hayman replied that this would not be legal He said that customers at first objected to the tax, but now seemingly, they do not

J M Plaxco said that South Carolina had a General Sales Tax which was amended to tax certain items by affixing a stamp tax—this applies among other things to soda cigars etc

W H Rivard reported on legislation in Rhode Island especially relating to the registration of assistant pharmacists The law now requires four years of collegiate work and graduation Provisions were made for assistants to take the Board examination until July 1936 An effort was then made to register all assistants This was defeated and Rhode Island's law requires four year prerequisite This law was fought during the next session and the opposition appealed to the Governor As chairman, Mr Rivard and his committee secured petitions to the Governor and also the backing of the medical profession was obtained the Board of Health was contacted and within three days it was possible to get the Governor's approval The efforts to defeat the law are being continued and require alertness of pharmacists

The speaker referred to the Rhode Island law permitting druggists on payment of $100 00 to sell liquors The ASSOCIATION is strongly opposing the measure

P R Loveland referred to experiences in counteracting sales tax legislation and especially, the coöperative efforts The number of retailers representing every branch of business was so large that instead of the meeting being held in the Assembly Chamber it was necessary to adjourn to an auditorium As a result, the passage of a sales tax has been held up

C Leonard O'Connell stated that an effort was made to tax prescriptions under a Pennsylvania mercantile act, this has been amended excluding pharmaceuticals and prescriptions from the tax

He stated that Pennsylvania pharmacists did not desire to engage in liquor business Pennsylvania is in the liquor business, has its own stores and leases

George C Schicks said that in New Jersey pharmacists must pay a high license to fill liquor prescriptions

J B Pilchard said that in Pennsylvania pharmacists can fill liquor prescriptions without paying a license tax

R C Reese stated that in Kansas they had difficulties with drug stores having no registered pharmacist in charge, especially with stores that have changed hands Since January this has been corrected to a certain extent

The Kansas registration act was discussed by Messrs Reese and Swain

Secretary Swain inquired relative to State registration acts which give the power of granting or refusing store registration

B V McCullough stated that Indiana required endorsements as to character

A L I Winne said Virginia granted permits for one year He regarded the Virginia registration provision as one of the most useful, because there are no inspectors in the State The permits do not carry the Board Members' signatures, they are signed by the secretary The application is passed on by the Attorney General's office, if deemed necessary, the information desired is, the name of the applicant, that of the pharmacist in charge, his hours of duty and the name of the one who is left in charge during the absence of the pharmacist and the hours during which the place of business is open All the information is sworn to and the owner signifies that he will observe the pharmacy law

In West Virginia, practically, the same form is in use

R L Swain asked whether the permit registers the pharmacist Mr Winne replied that if the owner is not a registered pharmacist, the permit is given in the name of the pharmacist and when he ceases to be employed, the permit is canceled

Mr Reese inquired relative to refusal of permit, Mr Winne replied that if the pharmacy is not notarized, the applicant is notified, in his opinion the safest way is, if the application is in due form, that the permit be issued and take it away if there is non compliance with the law

J J Gill inquired of C T Gilbert regarding the certificate of fitness in Connecticut He replied that this certificate applied to those making application for State Liquor Control License

In reply to a question as to the kind of whisky that must be dispensed, R L Swain stated that it depends on where the liquor is dispensed In the District of Columbia, it must be official whisky The interpretations recently issued by the Food and Drug Administration—when a physician writes a prescription for whisky, the official article must be dispensed, but if the physician states *not* U S P then other whisky can be dispensed The Government has issued interpretations which will guide the pharmacist in labeling and dispensing Answering Mr Brown (Kansas) he referred to an occurrence where a prescription was brought to a pharmacist, being asked the price the customer advised that he could buy the whisky at another store for much less The pharmacist explained that the whisky he would give the customer was official, but the purchase was made at the other store He did not argue relative to the quality of the whisky, but it was the duty of the pharmacist, under the law, to dispense official whisky on a prescription

Mr Brown inquired if an inspector demanded a pint of whisky and that of the U S P is not in stock, can other liquor be dispensed?

R L Swain stated that this opened up a question which was the subject of the celebrated controversy between Dr Harvey W Wiley and Mr Howard Taft The Pharmacopœia defines Medicinal Whisky When whisky is called for, he considered it was always a safe procedure to ask whether a straight or blended whisky is desired

Mr Swain referred to a session of the Maryland Legislature limited to emergency matters and the most important was enactment of a satisfactory liquor control act for the State of Maryland Under it alcohol—used for medicinal, antiseptic and toilet preparations, flavoring extracts, and other preparations unfit for beverage purposes—was exempted from the State Excise Tax. Also pharmacists are permitted to fill prescriptions for intoxicating liquors as defined in the Act without the payment of a State license

The speaker continued by referring to legislation in Western and Pacific Northwest states relative to house peddling

A O Mickelsen said he had a paper prepared by F C Felter Parts of the paper follow

CAN HOUSE-TO-HOUSE SELLING BE STOPPED?

BY F C FELTER

The writer welcomes the opportunity to present such information as has developed and is available at this time, concerning the control through local ordinances, of the evil of house to-house selling

It is a fact beyond dispute and well known to your members, that retail druggists and merchants lose thousands upon thousands of dollars in business annually to the house-to house canvasser Among the items vended are many which should be sold by the retail druggist, they are deprived of business which should go to them as rent and tax payers and employers of labor in the community The same is true, of course, of other lines of trade

Many attempts have been made by municipalities to control this evil practice, most of them being through the license system In other words, house-to house canvassing is permitted upon the payment of certain license fees While this has been partially effective the fact remains that in most localities house to-house selling and soliciting continues more or less unabated Some of the larger firms who practice this system of selling pay the licenses and then proceed to take business from the retail merchants The city treasury is benefited while the retail merchants are deprived of business which they should have In many other cases the itinerant house to-house canvasser slips into town does his canvassing quickly and is gone again He evades the payment of a license and he takes away revenue which should have remained in the city and been spent with its local merchants

It has remained for the towns of Rock Springs and Green River, Wyoming, to solve the problem, at least this appears to be the case at the present time An attorney in Rock Springs is the author of the legislation which has been adopted in both these and other Wyoming cities and which seems to have every promise of withstanding all court attacks as to its constitutionality

The Green River ordinance was first brought to the attention of the *Pacific Drug Review* late in 1933 The writer, recognizing the new point of approach to the problem, as represented by this ordinance, addressed a letter to the mayor of that city The letter was turned over to the attorney who had originated the ordinance, Mr Thomas Seddon Taliaferro Jr , who promptly wrote giving not only a copy of the ordinance but details of the court tests by which the ordinance has been thus far upheld as constitutional

For the purposes of this article it is referred to hereafter as the Green River ordinance It follows

' *Be It Ordained* by the Town Council of the Town of Green River, Wyoming

"Section 1 The practice of going in and upon private residences in the town of Green River, Wyoming, by solicitors, peddlers, hawkers, itinerant merchants and transient vendors of merchandise not having been requested or invited so to do by the owner or owners, occupant or occupants of said private residence, for the purpose of soliciting orders for the sale of goods, wares and merchandise and/or for the purpose of disposing of and/or peddling or hawking the same is hereby declared to be a nuisance, and punishable as such nuisance as a misdemeanor

'Section 2 The town marshall and police force of the town of Green River are hereby required and directed to suppress the same, and to abate any such nuisance as is described in the first section of this ordinance

"Section 3 Any person convicted of perpetrating a nuisance as described and prohibited in the first section of this ordinance, upon conviction thereof shall be fined a sum of not less than twenty-five (25) dollars, or not more than one hundred (100) dollars, together with costs of proceedings, which said fine may be satisfied, if not paid in cash, by execution against the person of any one convicted of committing the misdemeanor herein prohibited

"Section 4 All ordinances and parts of ordinances in conflict with this ordinance are hereby repealed

"Section 5 It being deemed by the town council of the town of Green River that an emergency exists this ordinance shall be in force and effect from and after its passage and approval

'(Note In Rock Springs, Wyo , the ordinance also specifically prohibits solicitors for building and loan insurance, newspapers, books, pictures and periodicals)"

The writer determined to try to interest retail druggists throughout the Pacific slope field in the passage of similar ordinances in their cities It was, and still is, held by the writer that *retail druggists in almost every city could, if they would interest themselves in this legislation,* secure its passage by interesting retailers in other lines and, through the local Chamber of Commerce or women's organizations or both, secure its adoption

Your attention is directed to the fact that the Green River ordinance declares 'the practice of going in and upon private residences in the town of Green River, Wyoming by solicitors peddlers hawkers, itinerant merchants and transient vendors of merchandise, *not having been requested or invited* so to do by the owner or owners, occupant or occupants of said private residence, for the purpose of soliciting orders for the sale of goods, wares and merchandise, and/or for the purpose of disposing of and/or peddling or hawking the same, is hereby declared to be a nuisance "

And a nuisance it is Housewives will tell you so

Not only is the practice of ringing doorbells at all hours of the day a nuisance to the house wife but the entrance of itinerant vendors, hawkers, peddlers, etc , upon private property often leads to some sort of crime The solicitor, vendor or peddler may, through artifice or otherwise gain entrance to the residence for the purpose of *securing certain information which would later* lead to robbery He may, through his persuasiveness or force of salesmanship, dupe the house wife into trading off valuable securities for worthless stocks or merchandise He frequently sells the housewife something that she does not need or want or secures a contract for some long pay ment scheme which becomes a burden upon the head of the house He always takes revenue from that particular town or city which should be spent with its local merchants

Declaration of the "uninvited" entrance upon private property by these vendors as ' a nuisance" is wholly within the police powers of any municipality This has been affirmed by the United States Circuit Court of Appeals, Tenth Circuit, where the Green River ordinance was upheld as constitutional The Fuller Brush Company attacked the Green River ordinance and won its case in the District Court The town of Green River appealed the case to the United States Circuit Court of Appeals The case was decided May 11, 1933, and is reported in the 65th Federal, 2nd Edition, page 112 The Appeals Court reversed the District Court and sustained the ordinance as being constitutional and within the police power of said town

Among other things the court also said ' The frequent ringing of doorbells or private residences by itinerant vendors and solicitors is, in fact a nuisance to the occupants " and quoted from a decision of the United States Supreme Court as follows

> "This court has frequently affirmed that the local authorities intrusted with the regulation of such matters, and not the courts are primarily the judges of the necessities of local situations calling for such legislation, and the courts may only interfere with laws or ordinances passed in pursuance of the police power where they are so arbitrary as to be palpably and unmistakably in excess of any reasonable exercise of the authority conferred "

The writer is informed by Mr Taliaferro that the time limit for appealing this case to the United States Supreme Court has long passed

It would appear, therefore, that the Green River ordinance, declaring certain practices as a nuisance, is constitutional and will stand in the courts of most states The Corporation Counsel of Seattle, Washington declares this as his belief A prominent firm of attorneys in Portland, to whom the writer submitted the ordinance, said ' It is our opinion that to abate a nuisance is strictly within the police powers of any legislative body, whether state or city "

A law student, writing in the *Rocky Mountain Law Review* of the University of Colorado, who had made a particular study of this ordinance said "This Green River case may well be in later years looked upon as a landmark in this type of legislation "

So much for the facts as to the law itself and the courts' decisions and legal opinions

Now, just a word in conclusion *As a result of the writer's efforts a number* of cities in the Pacific slope field have started movements to have this legislation enacted Santa Rosa, Cali

fornia Prineville, Oregon, Yoncalla, Oregon and Lovell Wyo have already adopted the ordinance through the efforts of the retail druggists of those cities Probably fifty other cities of varying sizes in the Pacific slope field have initiated movements to have it placed on the statute books

It is the writer's belief that if the retail druggists in any town or city will band themselves together and work with the other retailers, this legislation can be passed It should be a simple matter to get women's organizations behind it as well as the local Chamber of Commerce and the pressure of these bodies upon the city fathers would secure the desired results

J J Gill stated that an effort had been made in Providence to pass such an ordinance, but unsuccessfully

On motion duly seconded it was voted to accept the paper for publication

R L Swain spoke of methods employed by the vendors He stated that the prices charged by these vendors were considerably higher than those of the average drug store Some of the vendors make the statement that they represent an organization and in that way secure a hearing

A O Mickelsen referred to the City Ordinance of Savannah, Ga , which had not been tested in courts but, in part has been considered unconstitutional Mr Elkins of Georgia, stated that the city attorney of Savannah held that the ordinance was in conflict with the state law The Georgia law permits the sale of patent and home remedies by General Merchants The Attorney-General ruled that the names of the home remedies would have to be enumerated *The Georgia law defines patent and proprietary as meaning the same General Merchants cannot* sell pharmaceuticals

R L Swain inquired of Mr Elkins whether the Attorney-General had ruled that the law enforcement officer shall construe the general terms

Mr Elkins replied that the Attorney-General held there was no one else to enumerate them Mr Swain discussed various opinions relative to the terms ' patent medicines, home remedies, ' etc He suggested that when questions came up regarding court decisions, that members address Secretary M N Ford He referred to the opinion of the Attorney-General (Hon Carey D Landis) of Florida which states that the Pharmacy Act (13757 1929) restricts in every sense of the word the sale of all medicinals to registered pharmacists

James H Beal said he had been asked for his opinion of that of the Attorney-General His reply was that if it can be sustained Florida has the best pharmacy law in the United States and as long as the Attorney General is willing to defend it let it stand

He also approved of the enforcement by the State Board of Health The defendant's Attorney cannot say the druggists are trying to monopolize—the State Board of Health enforces that part of the act Some have been desirous to strike out the provision which assesses registered pharmacists ten dollars annually for the support of the State Board of Health He advised that it was the cheapest law enforcement they could have Dr Beal referred to several stores which were compelled to take down the signs advertising family medicines' and domestic medicines " He was inclined to believe the supreme court would uphold the Attorney General

F W Meissner inquired relative to the meaning of a store being in immediate charge of a registered pharmacist " Dr Beal replied that if an inspector took up a specimen and no registered pharmacist was in charge it would be construed as no registered pharmacist in charge

Mr Elkins referred to the Savannah ordinance having been introduced by the Board of Health as helpful

Dr Beal said restriction of the sales of medicine was for public safety, public welfare His recollection is that physicians under the Florida law, are given reasonable liberty in handling chemicals biologicals, etc

R L Swain stated that about 1918 Dr E F Kelly conceived the idea expressed by Dr Beal that perhaps pharmacists were wrong, they were rendering a Public Health service and should not pay for the enforcement of the Act any more than a grocer should pay for police protection The first step was to place a pharmacist on the State Board of Health of Maryland In 1922 the Food and Drugs Act was so amended

Dr Swain said they asked the Governor if he would finance the enforcement of the Pharmacy laws and he replied that he could not, as he had made a pledge to simplify state government but if a place could be found in the existing state government where the activities would fit in he would finance them and so the Food and Drugs Act was amended Instead of the pharma-

the state of Maryland paying $10 00 per year the Governor sees to it that $15,000 00 is made available for enforcing the pharmacy acts

The speaker stated that if the enforcement program of the state and the legislative program can be tied up with the general health program a great deal of criticism is disarmed Instead of being purely a Board of Pharmacy program it is a part of the health program of the state, the same as vaccination laws and the like

Dr Swain presented two Attorney-General's opinions, one of them deals with Mr Meissner's question, namely, when is a registered pharmacist in charge? The Maryland Act demands that a registered pharmacist must be in charge of a store

He said further that in Maryland they had some difficulty with the supervision of the registration of poison sales He once heard Dr Beal make the statement that an enlightened pharmacist would be diligent in his observations of the poison laws, this he referred to, chiefly, because no other dealer is going to do that He is not going to the trouble that a pharmacist will in handling poisons He presented a number of experiences Several applied to various phases of the subject presented by Dr Swain

C T Gilbert spoke on the limitations of opening new stores in Connecticut, especially the conversion of perfume shops into drug stores A recent law requires registration of a new store and for this $200 00 is charged Only about five stores have been registered since its passage before that the number was from twenty to seventy five each year

R C Wilson stated that in Georgia they were considering compulsory registration laws and he asked Walter D Adams to explain the Texas law Mr Adams stated that this had been presented last year and published in the JOURNAL The question, however, relative to the constitutionality of Section 14 of the Pharmacy Law, this had been declared unconstitutional by the Attorney General The ASSOCIATION has brought a friendly suit against the Board of Pharmacy for the money which the Board has collected It is assumed that the money does not belong to the state and if it does not go to the ASSOCIATION then it will remain with the Board of Pharmacy It is proposed to take the case to the Supreme Court, if necessary Mr Adams also advised that the bill providing for a sales tax was defeated in Texas

R P Fischelis referred to three bills that had been introduced in the New Jersey Legislature, one of them provides for the revocation of licenses of registered pharmacists for crimes involving the violation of the narcotic and liquor law and for non-compliance with the Pharmacy Act The case came up a year or more ago when a pharmacist who had served time for violation because of the sale of wood alcohol for beverage purposes had served that term and applied to the Board for reinstatement that is, renewal of his registration The Board felt that he was not a proper person to be registered and the question was brought to the attention of the Attorney General who found that the Pharmacy Law did not provide for revocation of licenses for crimes involving moral turpitude Three years after the first occurrence this same pharmacist was convicted of forging narcotic prescriptions and again committed to jail and the Judge rather severely criticized the Board of Pharmacy for permitting that type of individual to continue the practice of pharmacy Then it was pointed out to the Judge that the Attorney-General had ruled that the law did not provide for revocation in such cases A strong letter was sent to the Legislature, but up to this time has not been passed

A second bill was introduced which passed both houses and was signed by the Governor providing for the annual registration of the pharmacies Whenever this bill came up it included a definition for the terms "drug store" and "pharmacy" and found objectors and so it was decided not to define the terms "pharmacy" and "drug store " That was made possible by the fact that an Act was passed in 1932 limiting the use of terms "pharmacy" and "drug store" and "apothecary shop" to establishments operated under the supervision of a pharmacist

The third piece legislation provided for a grant of power to the Board of Pharmacy to appeal to the Court of Chancery for injunctions to prevent the continuous violation of the law The Board is more interested in law enforcement and the proper conduct of pharmacists than in collecting penalties This legislation has not been passed There was also introduced without any intervention from pharmacists, a general resolution asking for investigation of cut rate cosmetics shops and chain drug stores The joint resolution provided for the establishment of a commission consisting of two members of the Senate, two members of the Assembly and two members of the State Board of Pharmacy, this has passed the house and is now pending in the Senate

L L Walton inquired whether Dr Swain had discussed with the Attorney General the character of the evidence that would be required in order to convict for conducting a pharmacy without having a registered pharmacist in charge He replied, that in Baltimore there is a working agreement with the State's Attorney for the City and he has requested that cases be brought to the magistrate courts This prevents cluttering up the State docket but if there are difficulties then the case comes back to the Attorney-General The magistrates have invariably said, that if cases are brought before them that there should be real evidence The decision has only come a few days ago and no effort has been made, so far, to put it into effect, but the Act states, that at no time should a pharmacist be left in charge, who is not registered

Mr Walton said that in Pennsylvania the State Board has been operating under the decision, for the last five to seven years, which holds that the pharmacist does not lose charge of the pharmacy by going out to meals or by being absent for one half day It has also been held that in order to prosecute there must be a sale

Dr Swain quoted from the Act which states no pharmacy shall at any time be left in charge of a person who is not a registered pharmacist It is based upon the selling of drugs or medicines or compounding and is simply a blanket statement

Mr Walton stated that the Pennsylvania law was effective along that line

Dr Swain was of the opinion that a short absence from the store would not be sufficient to convict He referred to a case in Baltimore when a pharmacist left the store and gave explicit instructions that he was going out He had also left a man in charge with the instruction not to fill any prescriptions or sell poisons during his absence The case came before Judge Owens and he said that the advice given was all right for the individuals concerned but did not take into consideration the many people of the city of Baltimore

Dr Swain explained that in Maryland and Missouri a jury is the judge of both the law and the facts In most states a court instructs a jury in the interpretation of the law in a criminal case, but in Maryland this is not so The court may refuse to give instructions or, when requested, to give them The instructions must be given in this way, "Gentlemen of the Jury, in response to your counsel s request your counsel requested that I interpret this act to you, but bear in mind under the constitution of the state of Maryland you are the judge of the law and the facts and you are in no sense obliged to follow it and you may disregard it " So that applies to the case referred to It depends on the decision reached by the jury

Mr Walton stated that in Pennsylvania a great many pharmacies are conducted by one registered pharmacist only and the Board has hesitated to penalize the pharmacist who leaves his store for a brief period

M N Ford referred to a case in Ohio It was an appeal case The case came to trial and the defendant stated that he was in full and actual charge as the law provided, that he was in daily charge of the store either by telephone, telegraph or by letter The case went against him and the Board was sustained by the Court of Appeals

W B Philip stated that the decision from the Attorney General of Maryland is legally correct but he would be surprised if a lower court would convict and he spoke from experience, but considered the decision from the Attorney General a very interesting one He felt that the decision was a useful one even if it could not be carried into effect in every instance

R P Fischelis referred to a case in New Jersey where the pharmacist was frequently absent and his wife was left in charge She would not sell anything that conflicted with the law, but a sign was displayed and this was called to the attention of the Attorney General, he suggested that photographs be taken at various intervals during which the store was not in charge of the pharmacist The Board went to court with that evidence and a conviction was given There were four days in which no pharmacist was in charge of the store In the case of persistent violations the proceedings should be taken down and the judge of the lower court will give careful consideration before rendering his decision

A L I Winne stated that he had an experience when the Virginia Assembly met and there were several measures under consideration that affected pharmacists and merchants They were interested in issuing retail licenses and wholesale licenses and quite a number of different activities were concerned, so he found himself drawn into a formed organization representing about 26 groups These worked together in the interest of a tax by which the Governor was endeavoring to raise a million dollars for schools To a certain extent they were successful but the interesting thing was the possibility of such a line up for working together for legislation

J Lester Hayman stated that they had a bill before the Legislature which was sponsored by hotel and restaurant people In it was a section which evidently was overlooked, it provided that where medicines were prepared and sold this department must be separated from the rest of the establishment by sound proof partitions from the ceiling to the floor and this concerned many pharmacists

M N Ford referred to the filling of prescriptions for whisky involving a question before the Supreme Court at this time A liquor control act was passed a few months ago and in order to take care of the business until an organization was made effective the control was wished upon the Board of Pharmacy These permits were issued to about one half of the druggists of the state and the question was raised as to what was whisky The druggists had to stop selling whisky and take out permits to fill prescriptions only

Recently an individual tax payer of the state filed suit against the State Liquor Control Board for selling or contemplating to sell blended whisky This is now before the Supreme Court

W Bruce Philip referred to House Bill 3758 changing the designation ' Retail Liquor Dealer Tax" to "Medicinal Tax " It is now before the Senate Finance Committee of which Senator King is the chairman The meeting was then adjourned

---

The British Pharmaceutical Codex Published by direction of the Council of the Pharmaceutical Society of Great Britain The Pharmaceutical Press, 23 Bloomsbury Square, W C 1 London, England Price 35 shillings, foreign postage extra the price does not include duty

Various supplements antedating the Codex have appeared in England since early in the last century, the purpose being to provide recognized formulas for medicines which were not official in the British Empire Gray's Supplement was first published in 1818 and was subsequently edited by Professor Redwood, other publications followed which met with more or less favor according to standing of the author or compiler but without recognition beyond that

The need for a work issued under the authority of some statutory body was expressed by resolution in 1904 and responsive thereto a committee was organized by the British Pharmaceutical Society for carrying the purpose declared in the resolution into effect The chairman of the committee was Michael Carteighe, the sub committee in charge of the collection of data and information was made up of members well and favorably known to pharmacy among them Dr W E Dixon Prof H G Greenish (deceased) The research work required for the solution of problems was performed partly in the Laboratory of the British Pharmaceutical Society in the teaching institutions and of individual members of the Society

The scope of the work was defined by describing it as "an Imperial Dispensatory for the use of medical practitioners and pharmacists," and named—"The British Pharmaceutical Codex"

The general plan has been followed with revisions and additions, in the contents and arrangement and keeping step with the progress in pharmacy and changes in materia medica

Two of the more important changes in the revision of the edition of 1907 were the additions of brief descriptive notes on the preparations of each drug and chemical at the end of the respective monographs and the inclusion of a pharmacological and therapeutic index

Other parts of the book in its several editions have been prompted by revisions of pharmacopœias and official formularies and developments in materia medica and therapeutics and improvements and suggestions which have given greater value to the Codex

About one thousand substances have been given consideration in monographs, in addition, matters relating to chemical and physical properties or botanical characters action and uses and summary of preparations, new remedies sources of proprietary preparations, information relative to vaccines, vitamins etc In general it may be said that the plan of the Codex does not differ greatly from American dispensatories A comprehensive index is included and the subjects are considered in four general divisions Part I General Monographs on Chemicals, Crude Drugs etc Part II, Surgical Dressings Part III Formulary Part IV, Appendices—tables, general tests reagents, methods of sterilization, pharmacological index trade names, proprietary substances, etc

EDITORIAL NOTES

PHARMACISTS ALWAYS DO THEIR PART

The Christmas Seal this year commemorates the 50th anniversary of the beginning of modern sanatorium treatment in the United States by the late Dr Edward Livingston Trudeau at Saranac Lake New York, in February 1885 The one room cottage the seal depicts became the nucleus of the sanatorium movement in this country To day there are 659 sanatoria containing a total of 86 917 beds The cottage called the "Little Red' because of its color, is preserved at the institution founded by Dr Trudeau

JOHN WESLEY S KNOWLEDGE OF MEDICINE

Repetition of the following article may be of interest to some of the members of the AMERICAN PHARMACEUTICAL ASSOCIATION at this time, because of the anniversary celebration of the founding of the Methodist Church Reference is also made to an article in the May number of the JOURNAL for 1929, page 523 Through the kindness of Lawrence Williams, of Baltimore the ASSOCIATION is in possession of a copy of Wesley's Formulary " 26th edition

A Mortimer, writing in the Special Issue' of the *Chemist and Druggist*, June 25 1921 states that in all references to John Wesley and his life work he has read the knowledge of medicine possessed by Wesley seems to have been ignored Mr Mortimer presents a number of abstracts from ' Primitive Physic or an easy and natural method of curing most diseases," by John Wesley These books were advertised to be sold *at the Rev Mr Wesley's Preaching Houses in Town and Country* The preface to the first edition is dated June 11 1747 a bibliographer has ascertained that the book treats of 243 ailments and contains 725 recipes The history of medicine is briefly traced in the preface and the following is taken from the article referred to "In the early days physic," says Wesley, "as well as religion was chiefly traditional Father handed down to son what he himself had in like manner received, concerning the manner of healing both outward hurts and the diseases incident to each climate and the medicines which were of the greatest efficiency for the cure of each disorder Then when it was seen how the beasts would use certain natural remedies to cure their ills they were tried for human beings with good results, and experience and physic grew up together In addition to this knowledge many accidental discoveries were made which led to the wider use of many hitherto unknown remedies Hence rules for the application of these, and medical books were immensely multiplied, till at length physic became an abstruse science, quite out of the reach of ordinary men Physicians men who knew a little more about medicine than the average person, now were held in esteem as persons who were something more than human Profit attended their employ as well as honour, so they had now two weighty reasons for keeping the bulk of mankind at a distance that they might not pry into the mysteries of the profession Wesley then goes on to show that the medical men of the time of which he is speaking insisted that a knowledge of anatomy, natural philosophy, and even astronomy and astrology were necessary to the understanding of the art of healing They introduced complex medicines consisting of so many ingredients that it was impossible to know which wrought the cure

U S RADIUM IMPORTS

The Belgium Congo has been the world s chief source of radium although some has been produced in Czechoslovakia and, in 1930 radium ore was discovered in northern Canada

According to C C Concannon chief of the Commerce Department's Chemical Division, radium is by far the most valuable commodity ever produced While the United States is the world's largest consumer it has imported less than one third of one pound of the substance during the last decade and for this small amount has paid more than $6,000 000 00 During this period imports have remained fairly steady at around 125 to 170 grams valued at from $400 000 00 to $575,000 00 per

annum, until 1930 when imports advanced to 260 grains valued at $925,000 00, the largest amount ever imported during one year In 1933, 179 grains valued at $576 000 00 were imported, at an average invoice price of $3217 00 per grain, and during the first seven months of the current year $400,000 00 worth was purchased abroad, it was stated

The bulk of radium imports comes from Belgium which controls the Congo output, while smaller consignments are received from Canada and elsewhere

TETANUS TREATED WITH CURARE

Curare has recently had its value assessed in the treatment of tetanus Two cases are reported, in the first, a laborer (39), four doses of "gourd" curare, each 0 032 Gm was given subcutaneously at six hourly intervals on the eleventh day following the injury and four days after the onset of tetanus symptoms Within two hours of beginning the treatment the spasms were less severe, the patient had less pain and was more comfortable The improvement continued for forty eight hours, later, by another injection, 0 032 Gm was given The patient ultimately recovered In the second case, a boy aged 7, an initial dose of 0 0075 Gm was given subcutaneously, followed in ten minutes by the same amount, after a further ten minutes by 0 015 Gm and forty minutes after the first dose with another one of 0 015 Gm By this time the rigidity had disappeared, but respiratory difficulty followed and the patient died Both patients received, in addition, routine treatment with tetanus antitoxin —(*Lancet* (1934), 5792, 475)

NEW YORK BOTANICAL GARDEN CATALOGS ITS PLANT NAMES

An important research project, which has already begun to prove its value, has been completed at the New York Botanical Garden through the assignment of unemployed persons by the Works Division of the Department of Public Welfare This is the compilation of the Index Kewensis, a series of six loose leaf volumes containing the generic and specific names of plants and all the sources of technical knowledge available It represents one of the romances of scientific research, and is said to be the only one of its kind

OVERDOSE OF PARALDEHYDE

Evidence was given by a nurse of the hospital (Fettercairn Hospital, Hamilton, Australia) that she had telephoned to a chemist for eight drachms of paraldehyde This paraldehyde had been injected as a preanesthetic

The apprentice of the chemist in evidence said he had taken the telephone message, which was an order for eight ounces of paraldehyde The coroner found that death was caused by heart failure due to paraldehyde poison, and accelerated by extensive pleural adhesions to both lungs, and a flat and flabby heart He found that the quantity of paraldehyde administered was eight ounces, whereas the quantity prescribed was eight drachms, and that the excessive quantity given was due to a mistake made in the preparation and administration of the drug by a qualified certificated nurse He also found that when unfavorable symptoms manifested themselves every effort was made to restore animation

FOR REAL PHARMACAL SERVICE

'Every branch of the drug trade must recognize the importance, with respect to the general welfare, of the pharmacist in the retail drug store If it were not for the confidence justly placed by the public in the local pharmacist, many of the opportunities and privileges of the drug trade would not exist It cannot be questioned that as public confidence in the pharmacist may lessen, as the drug store may become less and less an institution of public health, the rights of manufacturers of drugs and medicinal preparations will be restricted by legislation enacted in the public interest

"Certain consumer interests, largely miscalled and almost wholly self-appointed, have not been idle in recent months in the matter of stripping the drug industry of important privileges One of the objectives is the supplanting of the existing pharmacally prepared official standards for drugs with government made standards It is, of course, the professional pharmacist who represents the professional work of the drug industry in the eyes of the public It is imperative, therefore, that he should be truly representative of the highest ideals and purposes of his calling It is equally necessary that these ideals and purposes be maintained on the highest possible plane"— From an editorial—*Oil, Paint and Drug Reporter*—September 3, 1934

PERSONAL AND NEWS ITEMS.

Fred B Kilmer has been active in compiling historical data and exhibits of Christ Church,

New Brunswick, organized in 1742 Even brief records are impossible, however the exhibit of a photostatic copy of a deed or lease from Philip French Esq is referred to as a long time lease The document is a lease for 2000 years from December 4, 1742, for the plot of *ground 150 x 150 feet on which the church* now stands, the lease will expire in 3742 and the annual rental named is "two peppercorns per year, if demanded "

Among recent visitors at the American Institute of Pharmacy were Dr Walter Schmid, Dresden, Germany, Dr Julius F Leo, Dresden, the former is food and pharmaceutical chemist and the latter's pharmacy recently celebrated its 450th anniversary Among other visitors—Miss Grace I Harper, registrar of Rutgers University College of Pharmacy, Fred A Lawson, Stoneham, Mass , Mrs C H Huntley, New Haven, Conn , Charles G Ajax (and wife) president of Washington State Pharmaceutical Association, Floyd B Johnson, Calhoun, Ga

The interest of the Press, in the American Institute of Pharmacy is shown by publishing brief sketches and pictures of the building We have before us a clipping with an excellent print of the *Kerkhoven*, Minn , *Banner*, under date of September 7th

Dr Walter and Dr Ida Noddack, Berlin, have been awarded the Scheele Medal of the Swedish Chemical Society

Prof Georg Gamow head of the department of physics and mathematics at the Polytechnic Institute at Leningrad, has been appointed visiting professor at the George Washington University for the coming year During the summer Dr Gamow was a foreign visiting member at the twelfth annual physics symposium of the summer session of the University of Michigan At George Washington University he will give a seminar in theoretical physics and will continue his research on the atomic nucleus

E W Runyon, member of the A PH A , since 1875, has returned from England after a two months' sojourn and is again at his desk

Edgar Warfield, Alexandria, Va , veteran pharmacist (aged 92 years) after 78 years of service is still active in his profession In a picture of the *Evening Star*, Washington, September 6th, he is shown with his son and grandson in the prescription department This is no unusual occurrence, for he comes to the store every day

A. B Stevens, member of the A PH A , since 1885, former dean of the College of Pharmacy, University of Michigan, now of Escondido, Calif , has been spending several weeks in Ann Arbor A dinner party was given for him by Prof and Mrs C C Glover, members of the family and former associates were present

Prof Justin L Powers is pursuing graduate work in the University of Wisconsin

Secretary H C Christensen, chairman of the *Pharmacy Exhibit at the World's Fair*, and Mrs Christensen celebrated their forty-first wedding anniversary at the Swiss Village, A Century of Progress, September 6th Mr and Mrs A Finstead, of Miami, Fla , were honored guests of the occasion

Prof G Barger was presented with the Hanbury Medal at the opening of the 93rd session of the School of Pharmacy [1] of the British Pharmaceutical Society, on October 3rd Professor Barger is not a pharmacist, he is Professor of Chemistry in relation to medicine in the University of Edinburgh, and is well known for his work on ergot and jointly with Dr F H Carr was a discoverer of ergotoxine

Director Claudius T Murchison, of the Bureau of Foreign and Domestic Commerce, delivered a radio address to the National Industrial Advertisers' Association during their meeting in Cincinnati On September 21st, Mr Murchison gave a historical résumé of the development of machinery in the industrial world This has created problems and produced triumphs The achievements of the machine should be preserved and fostered not only in the interest of society, but in the interest of profitable business The problem is, what can be done to improve conditions?

A R. L Dohme has presented to the School of Pharmacy of the University of Maryland a portrait of his father, the late Charles E Dohme, who was president of the Institution in its earlier years The latter was president of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1899

Through the Courtesy of Frank L Black, the ASSOCIATION has received from Dr James C Clarke, Baltimore a hand scale with set of weights Also, a framed receipted bill from the pharmacy of Dr Hynson Jennings & Co , dated June 8 1863

[1] Dr Barger delivered the inaugural address

WILLIAM PROCTER, JR, AWARD

John Uri Lloyd, senior member and past-president of the AMERICAN PHARMACEUTICAL ASSOCIATION pharmacist chemist educator and author, was honored at a special ceremony, October 9th at the Philadelphia College of Pharmacy and Science in recognition of his many and varied contributions to his chosen professions To him was presented the Procter International Award in the form of a suitably inscribed gold watch

This award is named in honor of William Procter Jr (1817–1874), a graduate of the Philadelphia College and long a member of its faculty and editor of its *American Journal of Pharmacy* William Procter, Jr 's contributions to pharmacy and related sciences have won him undying fame

The presentation of the award was made by Dean Charles H LaWall and the award conferred by President Wilmer Krusen The recipient responded with an informal address Preceding the award, Chairman Samuel P Wetherill, Jr, of the Board of Trustees, delivered an address and the exercises were opened with a biographical sketch of William Procter, Jr, by Prof Ivor Griffith

DEDICATION OF LILLY RESEARCH LABORATORIES

Following an inspection by the Indianapolis Druggists' Association on Tuesday and a visit by the Indiana State Medical Association on Wednesday, the formal dedication of Eli Lilly & Company's new research laboratories took place on Thursday, October 11th and was continued on the next day by inspection trips and addresses by guests of honor Nearly one thousand guests were present and these came from all sections of the country, among them R P Fischelis, president of the A Ph A The faculties and laboratories of many pharmacy schools were represented

Featured on the program were the dedication address delivered by Eli Lilly president of the company, and chairman at the dedication, and comments on research in manufacturing pharmacy by Josiah K Lilly, chairman of the board of directors of the company

"The Unpredictable Results of Research" formed the substance of an address by Dr Irving Langmuir famous American scientist and director of research for the General Electric Company His address was followed by a review on 'The Early Story of Insulin," Sir Frederic Banting of the University of Toronto He was followed on the program by Sir Henry Dale chairman of the National Institute for British Research, who delivered an address on the subject 'Chemical Ideas in Medicine and Biology"

At a formal dinner tendered on Friday night by the Lilly organization at the Indianapolis Athletic Club, with J K Lilly functioning as toastmaster, the following speakers were heard Sir Henry Dale, chairman of the National Institute for British Research, Dr Elliott P Joslin of Boston, Dr George R Minot of Boston, Dr Frank R Lillie of Chicago, Dr Charles R Stockard N Y, Dr George H Whipple, Rochester Dr Carl Voegtlin, Washington, Dr G H A Clowes director of the Research Laboratories

WILSON & CO LABORATORY WRECKED

An explosion of undetermined origin in the pharmaceutical laboratory of Wilson & Co Chicago practically wrecked the building and injured three persons slightly The blast which occurred in a basement boiler room near a storehouse of chemicals, blew out all the windows there, demolished a supporting post on the first floor and caused part of the second floor office and laboratory equipment to be precipitated into the basement Immediately after the explosion, the basement was flooded with sulphuric acid from six shattered carboys

---

OBITUARY

Prof John E Groff, aged 80 years, for 40 years chief pharmacist of the Rhode Island Hospital and one of the founders of the Rhode Island College of Pharmacy, died at the hospital after a short illness The deceased joined the staff of the hospital in June 1891, as chief pharmacist, and held that position ever since

J Percy Remington died suddenly in Portland Oregon, September 17th while on a visit to his sister there He was the son of Professor Joseph P Remington

The deceased graduated from the University of Pennsylvania in chemistry in 1898, and later came to the Philadelphia College of Pharmacy, where he received the degree of doctor of pharmacy He was distinguished as an engineer and inventor and developed and patented many widely used mechanical devices for manufacturing processes

SOCIETIES AND COLLEGES

INTERNATIONAL CONGRESS OF PHARMACY

The Twelfth International Congress of Pharmacy will be held in Brussels from July 20 to August 5, 1935 The general secretary is M J Breugelmans 3 rue du Gouvernement Provisoire, Brussels

THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS

The National Association of Retail Druggists, in New Orleans, September 24th–29th was largely attended, to a certain extent due to the interest developed preceding the convention and the attractions of the interesting city in which it was held

Among the speakers of the N A R D aside from the officials who made illuminating addresses relating to the subjects under their control, were the following James H Beal, E F Kelly F V McCullough H J Anslinger U S Commissioner of Narcotics, James M Doran, Administrator of the Distilled Spirits Institute and W Bruce Philip of Washington

Naturally the code and its provisions was a subject of interest and entered into several addresses and reports The report of the Form of Organization Committee was of great importance, because it was found necessary if the N A R D is to continue representation on the National Retail Drug Code Authority, that the constitution and by laws be altered to some extent

While closer cooperation with the AMERICAN PHARMACEUTICAL ASSOCIATION was endorsed merger of the N A R D and A PH A was not approved Dr James H Beal's address dealt with the subject He gave a history of the organizations and detailed the activities of both

Referring to the AMERICAN PHARMACEUTICAL ASSOCIATION, he said in part

The dominant purpose of the A PH A in 1851 is its dominant purpose to day It considers the professional and scientific interests of pharmacy rather than its trade and commercial interests It studies and reports upon commercial methods and practices, but only as necessary adjuncts to the proper conduct of a pharmacy

It devotes consideration to the scientific and professional interests not only of the retailer but to the professional and scientific interests of pharmacy as a whole In fixing its requirements for membership it does not recognize any distinction between manufacturers, wholesalers or retailers between proprietors or clerks, between professors in colleges of pharmacy and scientific research workers What it does require of its members is an active interest in the advancement of professional and scientific pharmacy

'Another striking feature of the A PH A is that it is controlled by a House of Delegates, the majority of whose members come from state pharmaceutical societies, so that the A PH A in fact is, and might very properly be called the Federation of State Pharmaceutical Associations

RESOLUTIONS

A large number of the resolutions applied to business matters and relations with other organizations, legislation approval of the work of officers and the Association's activities Among many resolutions the following are mentioned

Opposing the filling of prescriptions by hospitals for non patients and asking the American Hospital Association to urge its members to cease this practice

Disapproving the use of the word 'drugs" in newspaper stories when ' narcotic drugs" are intended

Praising the work of the 'Old Apothecary "

Urging continuance of support to National Pharmacy Week and suggesting that retailers hold 'open house' during this week

Urging the issuance of a commemorative postage stamp in honor of the American Institute of Pharmacy

Urging all associations to affirm and support a national fair trade act and recommending that all state associations seek the enactment of legislation similar to the California fair trade act

A recommendation by President Powell that the association move its offices to Washington was approved by the finance committee

The following officers were elected for the ensuing year

Harvey A Henry of Los Angeles, was elected *President* of the Association Other officers are as follows *First Vice President*, H O Chichester, of Macon Georgia, *Second Vice President*, Zack Kerrigan of St Louis, *Third Vice-*

President, M V Hardesty, of Louisville, *Secretary*, John W Dargavel, of Chicago, *Treasurer*, Oscar Rennebohm, of Madison, *Executive Committee*, John Witty, of Portland, and Thomas Smith, of Wilmington, for three years each, Monte Powell, of Denver, for two years, and C Fred Wright, of Boston, for one year

FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION

Mutual and coöperative wholesale druggists were urged to cooperate individually with manufacturers, wholesalers and retailers in efforts to establish plans of price stabilization which benefit the retail druggist, in a resolution approved by the Federal Wholesale Druggists' Association at its nineteenth annual convention, held in Providence, R I, September 16th to 19th The action followed a discussion and members frankly and earnestly expressed their views on discounts, rebates and dividend allowances

Hon Harry J Anslinger reported to the Association that uniform state narcotic laws had been enacted by Florida, Nevada, New Jersey, New York, Rhode Island, Kentucky, Virginia and South Carolina

The following officers were elected *President*, Harry Krupp, Philadelphia, Pa, *Vice-President*, Edward Seiberling St Paul, Minn, *Secretary*, Lee Williamson, Baltimore, Md, *Treasurer*, George Raab, Providence, R I, *Members of the Executive Committee*, O W Osterman, Philadelphia, Pa, T F Williams Buffalo, N Y, Paul Pearson, Washington D C, O J Cloughly, St Louis, Mo, Joseph Dreyer, Newark, N J

The Association formed a new committee on propaganda and invited buying which will study and direct procedure in connection with price stabilization The members of the committee are J J Dreyer, Newark, N J, O J Cloughly, St Louis, R E Lee Williamson, Baltimore, and F T Roosa, Cleveland

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

Ogden L Mills Secretary of the Treasury under President Hoover, was one of the speakers at the meeting of the National Wholesale Druggists' Association The convention at White Sulphur Springs, October 1st–5th, which was the 50th annual meeting, broke all precedents for attendance and interest

Another speaker of the convention was Wheeler Sammons, director of the Drug Institute, whose address was based on difficulties encountered in efforts to bring peace to industry

Dr H J Ostlund of the University of Minnesota spoke on "The Distribution of Costs" in an effort to find out what it actually costs to have products reach the hands of the consumer

Discussions on the codes and business affairs entered into program and President Elect A Kiefer Mayer made an analysis of the effect of the codes and how business must be shaped in order to successfully meet the demands

Robert Lund presided as toastmaster at the banquet

The following officers were elected for the ensuing year

Honorary President, Andrew J Geer, Charleston, S C, *President*, A Kiefer Mayer, Indianapolis, *First Vice-President*, Dudwig Schiff, Los Angeles, *Second Vice President*, W W Starkey, Pittsburgh, *Third Vice President*, Edward S Albers, Knoxville, Tenn, *Fourth Vice President*, Sam Dunlap, Jacksonville, Fla, *Fifth Vice-President*, Charles Bergman, New York, *Members of the Board of Control*, William Ochse, San Antonio, Texas, Norman B Livermore, San Francisco, and George Van Gorder, Cleveland, Ohio, *Executive Vice President and Secretary*, E L Newcomb, 51 Maiden Lane, New York City, *Treasurer*, Title Guarantee & Trust Co, New York City, Washington *Representative*, W L Crounse, Washington, D C

AUSTRALASIAN PHARMACEUTICAL CONFERENCE

Melbourne Centenary Meeting, January 16–23, 1935

The biennial meeting of Pharmaceutical Associations of Australia and New Zealand will be held in Melbourne from January 16 to 23, 1935 Concurrently with the convention of the Associations, the meeting of the Australian and New Zealand Association for the Advancement of Science will take place Pharmacists are represented in the latter Association by a section of their own—Section O, Pharmaceutical Science Dr Roy Gardner, of Dunedin, N Z, is president of this section It is in Section O meetings that the scientific and technical papers are read

What is known as the Australasian Pharmaceutical Conference is the Pharmaceutical Associations meeting At this meeting matters affecting the professional and business interests of pharmacists are discussed A committee is now at work preparing the business agenda,

and it is expected that the 1935 meeting will be productive of good results

MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY

The division enjoyed well attended sessions which were of unusual interest because of the quite general discussion which followed all papers on the program Perhaps of chief interest was the Symposium on Medicinal Analysis This was essentially an informal gathering It offered ample opportunity for discussion between the various groups as to difficulties encountered in this field, and various methods and laboratory technique were brought out

New officers of the division for the ensuing year were elected as follows *Chairman* John H Waldo, *Vice Chairman*, Walter H Hartung, *Secretary-Treasurer*, D L Tabern

AMERICAN REGISTERED PHARMACISTS' ASSOCIATION

The Thirty First Annual Meeting of the American Registered Pharmacists' Association was held in San Francisco August 1st to 4th The following officers were elected for the ensuing year *President*, Albert C Kasper, San Francisco, *First Vice President*, A A Madsen, San Francisco Hospital, San Francisco, *Second Vice President*, Alice M Riordan, Los Angeles, *Secretary Treasurer*, E S Berwick San Francisco *Directors* Albert Keller, San Francisco, Robert Guild, Sacramento, William Gebhart, San Jose, Roy E Hazlett, Jr Davenport, Iowa

CANADIAN PHARMACEUTICAL ASSOCIATION

The Canadian Pharmaceutical Association held its twenty second annual session in Saint John, August 6th–9th, and commenting thereon the *Canadian Pharmaceutical Journal* states that the meeting will be remembered as outstanding in the history of the organization

Three guests are especially mentioned in the columns, namely, President R P Fischelis of the AMERICAN PHARMACEUTICAL ASSOCIATION, who brought greetings from that organization, Dr R E Wodehouse, Deputy Minister of Pensions and National Health Ottawa who enlightened the members on the work being carried out by that department, Col C H L Sharman Chief of the Narcotic Division, Ottawa who discussed some of the difficulties of the division

The *Canadian Pharmaceutical Journal* of September 15th comments on the address of President Fischelis in which he commended Canadian pharmacists on their unique organization which comprised all the druggists of the Dominion He stated they should keep their forces consolidated and permit no division in their ranks

It was deeply regretted that President H D Campbell of the Association could not be present on account of illness from which he is recovering A letter of appreciation and greetings from him was read

The following officers were elected for the ensuing year *Honorary Presidents*, J J Kinley, Lunenburg, N S E Clinton Brown, Saint John New Brunswick, Henry Groulx Montreal Quebec, W G Smith Welland Ontario H D Campbell, Winnipeg Manitoba, W C Black, Calgary, Alberta, *President*, J H Best, North Battleford, *Vice President*, S R Balcom, Halifax, N S , *Chairman*, A J Wilkinson, Windsor, *Secretary* R B J Stanbury, Toronto

The Pharmacy Week window installed by Reddin Bros , Charlottetown won the F A Jacobs Trophy, which was presented during the meeting The window featured prescription practice and a general and historical exhibit of iodine and several pharmaceutical processes

Dean G A Burbidge spoke on ' Pharmacy in the Drug Store " He outlined the methods adopted by the Province of Nova Scotia for the education of pharmacists, and referred particularly to the arrangements providing for certified clerks

Secretary R B J Stanbury of the Canadian Pharmaceutical Association, and Secretary F A Jacobs of the Ontario Retail Druggists' Association, participated in the functions of the Washington meeting of the A PH A , both are members and regular attendants at the annual meetings

NATIONAL PHARMACY WEEK

The *News Edition* of *Industrial and Engineering Chemistry* of September 20th, page 344, has an interesting article on this year's observance of Pharmacy Week In order to complete the detailed report, the statement should have been included that Pharmacy Week had its inception at the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1924 as one of the recommendations of Robert J Ruth in his address as chairman of the Section on Practical Pharmacy and Dispensing

PURDUE PHARMACY WEEK OVER THE RADIO

The story of pharmacy was told to the people of Indiana during National Pharmacy Week Short musical programs accompanied the daily talks, the music was furnished by members of the several families of the pharmacy school staff and by the students of pharmacy

The following were the speakers

Dean C B Jordan, "Pharmaceutical Education," President E A Ridgely, of the I Ph A , "What the Indiana Pharmaceutical Asso ciation Is Doing to Protect the Health in Our State," H W Heine, "The Pharmacist and the Law," Prof H G DeKay, "The Druggist " and Prof C O Lee, "The Inquiring Customer," Prof C J Zufall, ' How Man Came to Use Drugs "

INSTALLATION OF THE PRESIDENT OF THE UNIVERSITY OF IOWA

The AMERICAN PHARMACEUTICAL ASSOCIATION was represented by John Milton Lindly at the Installation Ceremonies of Eugene Allen Gilmore as President of the University of Iowa State Senator Lindly functioned in the group of delegates of Learned Associations and Foundations " He writes that when he graduated from the University the attendance numbered about 500, now about 8000, the great development was made largely during the presidency of the retiring president, Walter A Jessup

The attendance at the Inaugural Convocation was nearly 10,000, and the formal ceremonies were carried out in accordance with the University program participated in by State bodies and institutions, the student body and representatives of other educational institutions The name of Dean Wilber J Teeters College of Pharmacy is the fourth in the Board of Deans

PHARMACY TO-DAY

President Robert P Fischelis, of the AMERICAN PHARMACEUTICAL ASSOCIATION opened Pharmacy Week with a radio address on ' Pharmacy To-Day " The opening message stressed the importance of health and the service of pharmacy contributory thereto

The speaker referred to the care necessary in pharmaceutical practice and gave an example of the possibility of error through carelessness and incompetency The activities of the several divisions of the drug industry were depicted and reference made to educational and legal requirements governing pharmacy The address was comprehensive, interesting and well received

AERIAL POLLEN SURVEY

An aerial pollen survey was inaugurated by the Philadelphia College of Pharmacy and Science on September 20th, a ceremony marked the beginning of this survey Endorsement of the plan and commendation was offered at the meeting by Dr Theodore B Appel, Secretary of Public Health of Pennsylvania, Dr J Norman Henry, Philadelphia Health Director Dr Arthur C Morgan, Secretary of the Pennsylvania Board of Medical Licensure, and Dr Randle C Rosenberger of the Jefferson Medical College

The surveys are to be conducted daily and the collection made by air plane from the entire metropolitan area of Philadelphia and a section of southern New Jersey extending seaward twenty miles A model of one of the air planes to be used in the survey was presented to the College by Dr Henry K Seelaus who, with Dr A H Zifferblatt, is in immediate charge of the work Devices for collection of air samples during flights were designed and constructed in the college Engineering Department, under the direction of Frank N Moerk The air planes necessary for the flights have been donated by Richard Mark a patient of Dr Seelaus, and Dr Zifferblatt, who is a sufferer from hay fever

CANADIAN PHARMACY WEEK WINDOW

Friends of the late George E Gibbard, founder of the Canadian Pharmaceutical Association, have created a fund whereby the winning pharmacy window receives a Canadian cup and retains it for one year The winner will be presented with a miniature to keep permanently The window is to be a professional display Photographs of the window are to be sent to the provincial chairmen

Announcement of the winner will be made before the close of the Canadian Pharmaceutical Association 1935 convention and if the winner is present the trophy will be formally presented

---

Samuel L Hilton has added to his contributions to the Library, A PH A , by giving twenty volumes of the JOURNAL, A PH A , U S P Circulars, Treasurer's financial reports, N F Bulletins etc

Charles H LaWall has donated a number of photostat copies of historical records, among them page photostats of Charles Marshall's "Waste-Book "

DEDICATION OF THE CHEMISTRY BUILDING IN PARIS

Ceremonies in connection with the dedication of the Chemistry Building in Paris were held on October 19th and 20th The program provided for an address by President M Albert Lebrun of France, a visit to the building and a banquet in honor of the delegates and visitors

CALIFORNIA COLLEGE OF PHARMACY

The Board of Regents of the University of California has announced that it has assumed direct control of the California College of Pharmacy The College has been affiliated with the University since 1875, but had its own board of trustees and business managers

LEGAL AND LEGISLATIVE

BOARD OF SEVEN DIRECTS NRA

On September 28th, the National Industrial Recovery Board, created by Presidential Executive Order, took over the duty of administering NRA The Board is composed of S Clay Williams Chairman Leon C Marshall Executive Secretary, A D Whiteside Sidney Hillman and Walton Hamilton Blackwell Smith and Leon Henderson were named Legal Adviser and Economic Adviser, respectively to serve ex-officio as members of the Board At its first meeting the Board announced that there would be no drastic changes in either policy or personnel but that such alterations as experience proves to be necessary will be developed gradually It reappointed Col George A Lynch as Administrative Officer empowering him to sign such documents as do not require the personal signature of the President, and to continue supervision of the entire administrative machine of NRA

CODE AUTHORITY BUDGET

Public hearing will be held October 23rd, at the Raleigh Hotel, Washington, on the proposed Code Authority budget and basis of contribution for the retail drug trade

Amendments to the mandatory assessment clause and amendments to permit incorporation of the Code Authority and of local and metropolitan authorities also will be discussed

The proposed budget totals $50 000 00 for January 1 1934, to January 1 1935 It is proposed that each local and metropolitan drug establishment contribute up to $1 00 per employee per year and that of this sum the National Retail Drug Code Authority receive one dollar per retail drug establishment

CODE APPROVED FOR HAWAIIAN RETAIL CODE

The National Industrial Recovery Board, on October 15th, approved a code for the retail trade in the Territory of Hawaii This code will affect some 2800 establishments employing about 15 000 people It will become effective October 29th

This is the first approved code to apply solely to the Territory

Supplementary schedules appended to the code contain special provisions for retailers of drugs and allied products food groceries and their allied products music and radio, electric refrigeration, jewelry and allied products, and photography and photo-finishing

The code for Hawaii follows the mainland retail code closely The hours and provisions are identical establishing a basic maximum work-week of 40 to 48 hours depending on population and hours of store operation Minimum wages follow the same scale but are lower for Hawaii than on the continent, ranging from $9 00 to $12 00 a week

The Board s order approving the code specifically exempts members of the trade from the provisions of any other code to the extent they are engaged in retail trade in Hawaii It also stays the minimum wage provisions as to outside salesmen, and as to employees of retail drug establishments who spend 60 per cent of their time delivering merchandise outside of the shop

The code applies to "all selling of merchandise to the consumer and not for resale" in the Territory of Hawaii but selling milk and dispensing of drugs by doctors in the legitimate practice of their professions are exempted

Administration of the code is entrusted to a Territorial Code Authority made up of the chairmen of the County executive committees of the Retail Association of Hawaii The county executive committees are to act as County Code Authorities The trade practice provisions and the schedules for the various divisions of the trade follow very closely the rules approved for those trades on the mainland

WILLARD L THORP APPOINTED ASSOCIATE ECONOMIC ADVISER

The National Industrial Recovery Board, on October 15th, announced the appointment of Dr Willard L Thorp as associate economic adviser to the National Industrial Recovery Board in the Division of Research and Planning Dr Thorp will be the division's representative and chairman of the Advisory Council

Dr Thorp has been professor of economics at Amherst College and a member of the research staff of the National Bureau of Economic Research, Inc Since coming to Washington as a member of the Committee on Government Statistics he has served as director of the Bureau of Foreign and Domestic Commerce and is now director of the Consumers' Division of the National Emergency Council and a member of the Federal Alcohol Control Administration, the Committee on Mineral Policy and the Industrial Resources Committee

PHILIPPINES TO EXCLUDE FOREIGN PHARMACISTS

Following the advice of the Filipine Pharmacists' Union, the Filipino Pharmacists' Examination Commission, on July 20th, adopted the following two resolutions

1 Practice of pharmacist should be limited to Americans and Filipinos

2 Owners of dispensaries should be limited to Americans or Filipinos who are graduates of a school for pharmacy

It was further resolved that handling of drugs should be made only by Americans or Filipinos who have resided in the country for at least one year and that no license should be given to those who have no qualifications stated above after next January—*Japanese Retail Druggists*

TRADE-MARKS IN MANCHOUKUO

During the nine months that elapsed since the government of Manchoukuo enacted the trade mark law up to the end of July a total of 14,988 applications for trade-marks were applied for The principal applications have been from Japan, 12,010, Germany, 944, Great Britain, 879, United States, 459, France 219

ITALIAN NARCOTIC RULES

The new regulations concerning narcotics, as published in the *Gazzetta Ufficiale*, provide that penalties in the form of imprisonment for from one to three years and a fine of not less than *1000 lire* ($84 00) shall be imposed on any person who grows *Papaver somniferum* secretly, who produces crude opium or who collects or carries on traffic in opium capsules, leaves of coca and/or Indian hemp, writes the Italian correspondent of *The Journal of the American Medical Association*

No public or private place may be used for the gathering of persons who indulge in the use of narcotic substances, not only the keeper of the place but also the addicts are subject to a fine and/or imprisonment

Persons authorized to sell narcotics may not dispense them without a medical prescription nor to persons whose identity is unknown Morphine, diacetylmorphine, cocaine and their derivatives may not be sold other than in the form of an ointment or a solution The medical prescription must be written with ink or indelible pencil and according to a special form, it must contain a general description and the address of the patient, the amount of the dosage written out in full, and directions as to the manner and time of administration

ALABAMA LEGISLATION

Attorney General Thomas E Knight, of Alabama, has ruled that "The terms 'patent' or proprietary' medicines as in this act shall be interpreted to mean those package medicinal products advertised to the general public for certain medication, and not those products or preparations advertised to physicians under copyright or trade names to be prescribed, those products recommended by the U S P and the N F , except those items which should have been or may be classified as household remedies or those products or preparations which from their natural and known effects should have been dispensed, sold or prescribed for use by the public except upon the prescription or advice of a licensed physician or licensed pharmacist "

TEXAS

Bill Introduced Texas H 55 XXX proposes to forbid the sale of barbituric acid ' derivatives and compounds thereof under any copyrighted or chemical name," except on the prescription of a licensed physician The proposed act, however is not to affect the sale of such drugs by wholesale drug houses to retail pharmacists or to physicians A licensed physician is free to dispense these drugs, but, apparently, will be able to buy them from retail pharmacies only on prescription

SALE OF ACETYLSALICYLIC ACID TABLETS

The Federal Trade Commission has issued an order to the Bayer Company, Inc , New York, to cease and desist from using unfair competitive practices in the sale of its acetylsalicylic acid tablets The company is directed to cease using language in its printed advertising or radio broadcasting stating or giving the impression that "aspirin" is a trade mark of the Bayer Company, however, this order does not apply to advertising on packages to be sold in foreign countries in which the word 'aspirin" has been held to be the Bayer Company's valid trade mark A list of seventeen representations are given in the commission's order, which the company is not to use unless properly qualified, limited or explained Among them are such expressions as "It cannot harm the heart," ' Bayer aspirin is always safe," "Take Bayer aspirin for any ache or pain, and take enough to end it There is no harm in its free use," "Genuine Bayer Aspirin tablets promptly relieve headaches, neuritis, colds, toothache, neuralgia, sore throat, lumbago, rheumatism " The order is not to be construed as preventing the company from making proper therapeutic claims or recommendations based on reputable medical opinion or pharmaceutical literature, it was stated The third prohibition in the order is one providing that the company shall not in any way represent that acetylsalicylic acid tablets manufactured by other firms are counterfeit or spurious The company waived a hearing and did not contest the proceeding of the commission — From *Jour A M A* , 10/13/34

BOOK NOTICES AND REVIEWS

Organic Chemistry or Chemistry of the Carbon Compounds By VICTOR VON RICHTER Volume 1 Third English Edition, 1934 790 pages Published by P Blakiston's Sons & Company, Philadelphia, Pa

This is the sixth edition in the English language, being the third American edition The system of presentation followed in the previous German, English and American editions has been retained The first volume of this series deals with the aliphatic series only The order of presentation moves progressively from the hydrocarbons (1) to the halogen derivatives (2), the monohydric alcohols, aldehydes, ketones and carboxylic acids (3), the dihydric alcohols and their oxidation products, (4), to the trihydric, tetrahydric pentahydric, hexa- and polyhydric alcohols, each group being considered with its oxidation product Short chapters then follow, dealing with the carbohydrates, protein chlorophyl, bile pigments, sterols and enzymes

It has been interesting to compare this 1934 publication with the third American translation of the eighth German edition published in 1913 The same encyclopedic arrangement of products is observed The same presentation of material believed to be more important in large print and material believed to be of lesser importance in finer print has been followed Many paragraphs of the 1913 publication have been reprinted without change in 1934 The information presented has been brought up to 1932 on some subjects, but on others most recent references are to publications in the nineteenth Century Many references are to German or French articles which are not readily available Some specific developments have been stressed, such as the electronic theory of valency, and the parachor

The book will still prove useful in the orderly presentation of organic chemistry However, it needs to be supplemented in many points in order to harmonize with teachings on polar molecules, etc This book fills an intermediate role between the elementary texts and the encyclopedias, such as Beilstein —JAMES C MUNCH

Bacteriology and Sanitary Science By LOUIS GERSHENFELD, Ph M , B Sc , P D , Professor of Bacteriology and Hygiene and Director of the Bacteriological and Clinical Chemistry Laboratories in the Philadelphia College of Pharmacy and Science, Philadelphia Price, Limp Leather Binding, $4 50 Publishers, Lea & Febiger

Gershenfeld's second edition of Bacteriology and Sanitary Science is an interesting and authoritative treatise which covers both the technical and practical aspects of many of the important subjects on which the pharmacist has opportunity of offering sound advice In addition it contains a concise statement of many techniques which are useful to the up to date pharmacist in his own work

Obviously, a book devoted to such a large field of knowledge and practice cannot deal with each of the basic sanitary sciences—bacteriology, immunology, parasitology, sanitary engineering and the production of biological products—in complete detail Therein lies its virtue The author has accomplished the very difficult task of separating the specialist's chaff from the pharmacist's wheat The book is recommended to students and to registered pharmacists —JOHN M HANKS

New and Nonofficial Remedies —The American Medical Association has issued a supplement to New and Nonofficial Remedies for 1934 This supplement contains descriptions of the articles which have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association since January and do not appear in the volume prepared for 1934 The Council states that the acceptance of an article does not necessarily mean a recommendation, but as far as it is known, the preparation complies with the rules adopted by the Council Criticisms and corrections to aid in the revision of the next volume, before publication, are asked for

Burroughs Wellcome Research Institution and Affiliated Research Laboratories and Museums have issued a beautiful bound illustrated booklet of the exhibits at the Chicago Exposition Excellent half-tones of the ceremonies at the Corner Stone Laying of the Wellcome Research Institution grace the introductory pages Lists of guests and press reports follow

Whitla's Pharmacy, Materia Medica and Therapeutics William Wood & Company, Baltimore (Bailliere Tindell & Cox, London, England) 645 pages Price $4 25 Sir William Whitla, in the preface to the first edition (1881), stated that the aim of the work was to give to the student of medicine such information in a concise form as he generally has to sift out of two or more of the larger manuals The author was actuated by the feeling that pharmacy is one of the most important sections of Materia Medica, he believed that a knowledge of it should be an essential accomplishment of every educated physician It is evident that the author prepared the treatise, primarily, for physicians

Dr J A Gunn reviser of this edition 12th states that an effort has been to retain observations made by the original author which were based upon his own clinical experience and the actual text has been preserved wherever possible, extensive alterations have been necessary by the appearance of the new British Pharmacopœia Dr Gunn is professor of Pharmacology in the University of Oxford and his assistants in the revision, H Berry, is head of the Department of Pharmacy, Birmingham Central Technical College and member of the Board of Examiners of the Pharmaceutical Society of Great Britain, and J Clifford Hoyle M D , of the London Hospital is Examiner in Pharmacology of the University of Cambridge

The authors apply the term "Materia Medica" to the description of the physical characters of remedies, their origin source, distribution, chemical composition and the methods by which they are obtained, collected, preserved etc , ' Pharmacy" to the methods by which they are prepared and made ready for administration, "Pharmacology" to the science of their action on a healthy organism and 'Therapeutics" to their application in the treatment of disease

Eight pages are given to Treatment in Cases of Poisoning, the other divisions of the Book are Part 1, Pharmacy, 2, Prescription Writing, 3 Materia Medica of the British Pharmacopœia 4, Therapeutics, 5, Non Official Remedies Conciseness features the work and serves its purpose, without adverse criticism it may be said that other works on pharmacy are better adapted to the needs of pharmacists, but the text is well arranged and the matter well presented for the needs of physicians, and it may be said that if the volume was part of more libraries prescription writing would be improved

The British Pharmacopœia under 'authorized contractions" uses gram and then states that in order to avoid confusion the symbol ' G" should be used as the contraction for 'gramme " In Whitla, no attention is given to either contraction, "gm " is used, these variations are apt to confuse physicians in writing prescriptions

Considering the work as a whole, it serves a useful purpose for British physicians and pharmacists, for the American profession it has value as a reference book, more extended references could have been made to both professions and to legal phases applying to the practice of the professions

PHARMACY AND THE PROFESSIONAL SPIRIT *[1]

(ABSTRACT)

BY C ROBERT KEENE [2]

I remember climbing up a hill, behind the city of Marseille First of all I climbed a certain distance, and could then see just over the tops of the houses, a little further on I could see the city streets, and going higher up still, the docks and the great steamers The whole city and the wide horizon beyond could then be seen It would indeed be useful if we could stand aside and view the anxieties of impending examinations, and the difficulties of business in some such way, if we could view the profession you represent, and the part which you yourselves wish to play in it, in the light of a wider horizon, and with a truer sense of perspective

"I have been endeavoring to get to know from the trade journals more about pharmacists One thing is very evident to me—that you are expected by those who speak for pharmacy to cherish your profession as something which is honored by the community, and is also efficient and well organized in its corporate life Professions, however, carry with them certain implications Those who enter into a profession should be well qualified in mind and character in the work they are about to undertake Membership of a profession usually involves membership of a Society, and that Society requires from its members loyalty to its principles and loyalty to the body which acts in its interests as a whole Every member must regard the profession as holding a trust on the part of the public

'It is quite evident I think, that those of you who are going to take part in the work of the Pharmaceutical Society will have to decide among yourselves such matters of principle as *first* the limits of individual liberty, *secondly*, the degree of responsibility of the corporate body, *thirdly*, the place of local initiative and finally, the extent and degree of central control Members of your Society are having to face the difficulties and problems which confront thoughtful men in this modern world in many phases of life and it is to be hoped that they can be solved in such a way as to continue to claim the loyal and whole hearted support of the members

"Professions further imply the principle of public service If we think of the men who have devoted themselves in disinterested service to the Church, law civil service and other professions, we can realize what modern civilization owes to them The educated man is not supposed to work directly or indirectly for his own enrichment or for his own honor and glory He belongs to, and has made himself over to our order consecrated to ends transcending any such personal considerations This is the high standard to which pharmacists must seek to attain in the difficult work they do To be perfectly frank however, I think you have a more than usually difficult task, for after all pharmacists are often traders as well as professional men The ethics of advertising is also open to criticism, appealing, as it so often does, on the one hand to the vanity of people and on the other to the fears they have of, as for example, illness or personal embarrassment I mention this as a challenge implicit in your own ideals, for I firmly believe that the honor of your profession is high, and that your knowledge and integrity are rightly trusted by the public

Finally I would speak to the students It is to be expected that you should have before you, here and in the future the aim of success What you have to decide when you set about the aim, is the way you are going to achieve it Perhaps the surest way is to keep before you what can be truly called professional pride The test of success in any walk of life is not measured alone in the material rewards which life brings us but is the self respect that comes to us in doing our work efficiently and well and in the consciousness that we are keeping alive the best traditions of our race And not the least of the traditions to which you are committed by your entry into this profession of pharmacy is that of true and faithful service and work for the public good "

---

* From the *Chemist and Druggist* October 27, 1934 page 516

[1] From an address to the students of the Department of Pharmacy of Leicester College of Technology on the occasion of awarding prizes to successful students at a joint meeting with Leicestershire Branch of the British Pharmaceutical Society

[2] Councillor

ANDREW SCHERER.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII NOVEMBER 1934 No 11

ANDREW SCHERER

Andrew Scherer, member of the AMERICAN PHARMACEUTICAL ASSOCIATION for a half century, was born in Brooklyn, N Y , November 18, 1855, the son of George C and Mary Alsman Scherer The following year his parents moved to Chicago Andrew's apprenticeship began with Ludwig Fermow, a fine type of old-fashioned German apothecary, with whom he remained until the latter's demise, in 1874 Shortly afterward he entered the employ of C M Weinberger, another well-known Chicago druggist, where he was employed for six years

In those days the drug clerk was expected to grind drugs, sift them, make fluid-extracts and tinctures and other pharmaceutical preparations One of the daily duties of the apprentice was to go to the wholesale drug house, carrying a basket and wait for orders to be filled No salary was paid to the apprentice during the first two years

In 1873, Mr Scherer entered the Chicago College of Pharmacy and was graduated in 1875, one of a class of seven Included in the class were Robert Cowdrey, who was for some years editor of *The Pharmacist* and later was nominated for President of the United States on the Labor ticket, Hugo Martin, who took a prominent part in pharmaceutical organizations in Illinois and who was, at the time of his death, a member of the faculty of the College of Pharmacy, W F Woodson, who for many years conducted a drug store at Michigan City and served as its mayor for several terms, Charles Krusemark and Fletcher Smith, who later graduated in medicine and became prominent practitioners, and Charles Jacob, who was a pioneer pharmacist of Forest Park

In 1881, Mr Scherer engaged in the drug business on his own account at Division and Franklin Streets, Chicago, where he remained for five years He then bought a lot at State and Division Streets which he improved with a three story building He has conducted a pharmacy at this location ever since

In 1931, he celebrated the fiftieth anniversary of his entrance into the drug business as a proprietor and gave a dinner to a group of his friends, chiefly members

of the Chicago Veteran Druggists' Association, of which he is the honorary president.

Mr Scherer was married in June 1885 to Miss Agnes Dieden She died four years later leaving him with a son, Andrew, born in 1887, who is still living [1] In 1903 he married Miss Cordelia Maher who died in 1914 There were no children by this marriage

Mr Scherer was a member of the Chicago College of Pharmacy until it was taken over by the University of Illinois and served for many years as trustee and treasurer of the College, and has shown his interest in the College of Pharmacy by giving a prize each year to the member of the graduating class who attains the highest grade in pharmacy He has been a member of the Illinois Pharmaceutical Association almost since its organization and of the Chicago Veteran Druggists' Association since 1901 He joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1884 and has attended many of its conventions

THE CENTURY OF PROGRESS PHARMACY EXHIBIT

ACCORDING to the *Chicago Daily News* by Malcolm McDowell and quoted by the *C R D A News* of November 10th "The pharmacy exhibit will go to the Museum of Science and Industry, the Rosenwald museum in Jackson Park The reproduction of Philo Carpenter's log cabin drug store, the earliest in Chicago, which stood at the corner of Lake and Market Streets and was opened in 1832, will continue to illustrate the city's pioneer history in its permanent location in the museum With it will go the facsimile of the famous *Ebers Papyrus*, the original of which dates back to about 1500 B C and which was one of the most popular of the exhibits

"The story of digitalis, portrayed by dioramas in the exhibit, goes to Jackson Park along with the materia medica display which might well be called the story of the evolution of medicinal drugs The whole exhibit, as it now stands, visualizing the historical, educational and professional aspects of the science of pharmacy, will make a large showing in the Rosenwald museum It covers 1700 square feet as it now stands, with a frontage of 60 feet on the circular corridor of the Hall of Science Its purpose has been to set forth the history of pharmacy and to show its progress during the last century and also to stress the advances in educational and legal requirements It has carried out its purpose at the World's Fair—it will continue to demonstrate the interesting aspects of the retail drug stores at its new location in the Museum of Science and Industry"

Evidently the interesting proposal quoted above will be submitted to the exhibitors but it should be stated that at this time no official action has been taken by the American Pharmaceutical Association —Editor

FORMULARIES

"Side by side with the national Pharmacopœias numerous books of recipes have been produced in the various countries Three of these, the American National Formulary, the German Erganzungsbuch and the British Pharmaceutical Codex, merit special attention by reason of their publication by the national pharmaceutical organization of their respective countries The need for such formularies, produced by responsible public bodies, becomes more and more pronounced with the changes in the character of pharmacopœias and the decreasing attention given in them to formulæ"—C H HAMPSHIRE, Chairman's Address British Pharmaceutical Conference

[1] He is a graduate pharmacist and a graduate engineer

PHARMACY WEEK AND THE WHITE HOUSE

President Robert P Fischelis of the AMERICAN PHARMACEUTICAL ASSOCIATION addressed the President of the United States on the occasion of the Tenth Annual Observance of Pharmacy Copies of the correspondence follow

October 1, 1934

The President of the United States,
The White House,
Washington, D C

Dear Mr President

When the AMERICAN PHARMACEUTICAL ASSOCIATION dedicated its Washington Headquarters Building last May, you were kind enough to send us a message voicing your appreciation of the contributions which have been made by pharmacists to the successful alleviation and prevention of disease

May I now, in turn, in behalf of the pharmacists of America, on the eve of the observance of National Pharmacy Week (October 7–13) extend to you our great appreciation of your interest in the professions engaged in public health work?

We have followed with admiration the progress of your administration and desire to express to you our confidence in the progressive and forward-looking leadership which you have given to the Nation in these strenuous times

We desire, in particular, to offer our cooperation in bringing about necessary reforms in the public control of the manufacture and distribution of drugs and cosmetics, so that the consuming public may be protected against fraudulent practices which cannot be controlled under the present Food and Drug Law

Respectfully yours,

ROBERT P FISCHELIS, *President*

RPF J

THE WHITE HOUSE

Washington
October 8, 1934

My dear Mr Fischelis

Your letter of October first on behalf of the AMERICAN PHARMACEUTICAL ASSOCIATION has been received The President has asked me to thank you and everyone concerned most warmly for your expression of confidence and for your pledge of cooperation

Very sincerely yours,

LOUIS McH HOWE
Secretary to the President

Robert P Fischelis, Esq ,
AMERICAN PHARMACEUTICAL ASSOCIATION,
28 West State Street,
Trenton, N J

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

THE PHARMACY

THERE has been greater demand during the past several months for information that may be helpful in the establishment of professional pharmacies and reference is therefore made to two contributions published in the August issue of the JOURNAL There has also been discussion on the same subject in British Pharmaceutical publications

Liberty is taken in quoting from an article in a recent issue of the *Chemist and Druggist*

"Any suggestion to limit the sale of therapeutic agents to pharmacists is usually dismissed as Utopian, but no explanation is ever vouchsafed as to the desirability of perpetuating the unrestricted sale of medicines For this reason the pharmacist in this country (Great Britain) has been compelled to take up the sale of many articles more or less remotely connected with pharmacy, simply in order to make a living, and in taking up these side-lines he necessarily enters into competition with other traders"—An evidence that things may not be so very different from conditions in this country

It is therefore pleasing to refer to a professional pharmacy which succeeded a strictly commercial drug store, one wherein many items that had no relation to pharmacy were sold The change to the present status, which is exclusive, was the result of years of development, but after due consideration elimination of side lines was made quickly

The contributor of the other article conceived the idea that his establishment could render better pharmaceutical service by separating it into two divisions, one professional and the other devoted to the soda fountain, candies, cigars, etc Two entrances to the store from the street were provided, one leading directly to the professional pharmacy and the other to the commercial section This move, at first an experiment, has turned out to be very satisfactory

R L Swain concludes his column in *Drug Topics* of November 12th "No doubt real pharmacy will always be in conflict with the commercial side of the store No doubt pharmacists will always be torn between contending forces However, just so long as pharmacists maintain a proper balance between their various duties, and bring their best talents to professional work, drug stores will be truly public health institutions, and pharmacists, indeed, more than merchants"

"HOW MUCH IS A TEASPOONFUL?"

THE *Journal of the American Medical Association* comments editorially on the article on above subject in the August JOURNAL by F W Nitardy The editorial concludes "Since the average teaspoon obviously holds more than 4 cc, an effort should again be made to have a more nearly correct metric equivalent for the average teaspoon recognized in the United States Pharmacopœia"

The subject is somewhat in line with the reports of the Committee on Tolerances by S L Hilton, Robert L Swain and Hugo H Schaefer, published in the

August JOURNAL, 1934, and October issue of 1933, also with the extensive reports made by Marvin J Andrews on "Determination of the Reasonable or Permissible Margin of Error in Dispensing," and the "Accuracy of Medicine Droppers with Flared Tips," by William J Husa and Lydia M Husa

In the concluding paragraph of the latter article it is stated that "from the results given it is apparent that the medicine droppers with flared tips delivered drops 35% to 60% larger than recommended by the Brussels Conference "

Other interesting and important measurements are reported in the paper first quoted and all the references cited point out that variations in effect may be due to the quantity administered and not due to variations from the standards of the products dispensed How best to standardize the teaspoon for dosage has been a subject of study for many years and the importance is always brought forward by the revisions of the U S Pharmacopœia and National Formulary It remains a question as to whether the laity can more readily be impressed with the need of accuracy than the manufacturers Should the latter be required to stamp the measure of capacity on the spoon to be used for dosage? If so, 5 cc as a dose basis (teaspoonful), is suggested, following the standards and suggestions of others

DISGUISING VALUE OF COLLOIDALITY

A STUDY of vehicles for medicine has been the subject of a number of contributions by Bernard Fantus and co-workers In the one dealing with Acacia on the value of colloidality and that on Glycyrrhiza vehicles as disguising agents were brought out and seem worthy of further consideration As a vehicle for the administration of urea no vehicle was found to be as good as Syrup of Acacia, and methyl salicylate was found to be an ideal flavor for the syrup The results of the study suggest further investigations and applications

Glycyrrhiza has proven to be a valuable disguising agent by the medical profession, evidenced by the increase of its use in some prescriptions as shown in Professor Gathercoal's report The authors state that the disguising power of glycyrrhiza for saltiness appears to be more than a mere matter of sweetness, apparently, there is a loss of saline ions as far as taste sensation is concerned The latter results are discussed in the paper published in the September JOURNAL on page 916 A further result, however, is not as favorable, *i e*, Aromatic Syrup of Eriodictyon is superior for disguising the bitter taste of alkaloids The research has also brought out that there is variance in glycyrrhiza which affects the palatability of the preparations therefrom and this is not due to taste idiosyncrasies of individuals

The favorable and unfavorable reports have made the subject worthy of comment as it presents opportunities for pharmacists to cooperate in this research, which may be helpful in prescription service

---

GLYCYRRHIZIN CONTENT OF LICORICE JUICE

As the result of a comparative investigation, Z Csipke (*Ber u Pharm Ges*) concludes that either a standard should be set for the glycyrrhizin content of the juice or it should be prepared directly from the root The method of Eder and Sack in which the furfurol obtained from the hydrolysis of the glycyrrhizin is determined by precipitation with barbituric acid was found to be very satisfactory for the present purpose —G MIDDLETON, *Quart J Pharmacy & Pharmacology*

THE CONSOLIDATION OF PHARMACAL FORCES

BY ROBERT P FISCHELIS *

RECENT developments in American pharmacy have again emphasized the necessity for unifying the forces which contribute to the welfare of the profession and the drug industry A specific proposal upon which attention has been centered for a number of years is the proposed consolidation of the AMERICAN PHARMACEUTICAL ASSOCIATION with the National Association of Retail Druggists Emphasis was given to this proposal by the experiences of those engaged in the retail drug industry when they endeavored to obtain from the National Industrial Recovery Administration a Code of Fair Competition which would eliminate some of the undesirable features now hampering recovery The government demanded that those who claim to represent retail pharmacy should really represent it as far as numbers of units are concerned As long as no one questioned the authority of the representatives of retail pharmacy to speak for the industry as a whole, the question of membership statistics did not come to the foreground With the attempt to curb some of the practices resorted to by minority groups in the industry there came the challenge as to adequacy of representation by the spokesmen of the retail drug industry

It has been assumed that the National Association of Retail Druggists speaks for retail pharmacy from a business standpoint It appears proper, therefore, to urge every owner of a retail pharmacy to join the National Association of Retail Druggists in order to obtain proper representation along economic lines

The AMERICAN PHARMACEUTICAL ASSOCIATION, although representative of all phases of pharmacy including manufacturing, wholesaling, retailing, teaching, law enforcement, research and economics, took part in the formulation of the National Retail Drug Code and is listed among the sponsors of this Code It did not take such a part in the sponsorship of any other code within the drug industry It was natural, therefore, to assume the AMERICAN PHARMACEUTICAL ASSOCIATION to be predominantly interested in retail pharmacy, although such is not necessarily the case It was argued further, that there is no need for two national associations to look after the business interests of the retailer

More recently a proposal has been made to merge the interests of the various State Pharmaceutical Associations into a National Federation which would at once exceed in its total membership both the National Association of Retail Druggists and the AMERICAN PHARMACEUTICAL ASSOCIATION, because the sum total of members of State Pharmaceutical Associations is greater than the total membership of both national associations District conferences of State Associations recently formed appear to be the first step toward federating State Pharmaceutical Associations

With the foregoing facts as a background it is easy to understand why many retail pharmacists are advocating a physical merger of the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists Dr James H Beal, a former President of the AMERICAN PHARMACEUTICAL ASSOCIATION and a member of its Council, has argued eloquently against a physical merger of

* President of AMERICAN PHARMACEUTICAL ASSOCIATION

the two associations on the basis that their scheme of organization is different, that their objectives are dissimilar and that both are needed in their respective fields of service and influence for the development of pharmacy as a whole Many another past-president of the ASSOCIATION has been convinced after careful study that consolidation would be both desirable and possible if human factors could be controlled

The National Association of Retail Druggists, at its New Orleans convention, passed a resolution disapproving consolidation of the two national associations However, it agreed to appoint a committee to meet with a similar committee from the AMERICAN PHARMACEUTICAL ASSOCIATION to discuss methods of coordinating the activities of the two associations and bringing about closer cooperation between the National and State Associations

It seems necessary under the circumstances to clarify the position of the AMERICAN PHARMACEUTICAL ASSOCIATION on the subject of consolidation The writer of this editorial in his contacts with State Pharmaceutical Associations and in a communication to the National Association of Retail Druggists, expressed the view that physical consolidation and merger of the tangible assets of the two Associations is not necessary for a consolidation of pharmacal forces at this time It is the latter consolidation which pharmacists in the United States desire They are relatively uninterested in the method but they are very much interested in results It is conceivable, of course, that if methods are devised for unifying pharmacal forces and obtaining the results which pharmacists in all lines of activity so greatly desire, some form of merger of all associations now in the field may result in the future It is clear, however, from a careful examination of the political, financial and general situation within State and National associations that physical consolidation is not the first step in the process of consolidating existing pharmacal forces

It must likewise be clear to the keen observer that the AMERICAN PHARMACEUTICAL ASSOCIATION, with its all-inclusive membership, constitutes the starting point for united effort in all directions Its interests are general It is the oldest national Pharmaceutical Association and is commonly referred to as the Mother of Pharmaceutical Associations in the United States Its offspring may be found in every specialized field of pharmacy and the difficulty seems to be that the family has not had a real reunion for many years It seems as though the time for such a reunion is at hand and it is the hope of the present administration of the AMERICAN PHARMACEUTICAL ASSOCIATION that when its representatives meet with representatives of the National Association of Retail Druggists at the special committee meeting early in December and with the representatives of the National Drug Trade Conference at another meeting in December, the Mother Association will be looked upon as the leader in constructive effort for the good of the profession and that the specialized units within the industry, while pursuing their individual tasks and carrying out their specific functions, will nevertheless support a renewed consolidation of pharmacal forces for the benefit of all concerned

SCIENTIFIC SECTION

STUDIES ON BARBITURATES II CONTRIBUTIONS TO METHODS OF BARBITAL RESEARCH *

BY THEODORE KOPPANYI, JAMES M DILLE, WILLIAM S MURPHY AND STEPHEN KROP

In a previous paper (1) we described methods of extraction of barbiturates from urine, blood and tissues, and also colorimetric procedures to estimate the quantity of barbiturates so recovered The purpose of this paper is to describe certain improvements and modifications of our technique and some more recently developed methods, with a review of our original experimental procedures

I METHODS OF EXTRACTION

Urine

For ordinary routine procedures the urine is acidulated with dilute hydrochloric acid and shaken with ten volumes of chloroform This usually furnishes sufficiently clear extracts for testing Colored and concentrated urines, however, should be cleared Twenty cc of urine are shaken with an equal volume of a 10 per cent copper sulphate solution in a small separatory funnel after sufficient amounts of 5 per cent sodium hydroxide or potassium hydroxide solutions have been added to produce precipitation The mixture is filtered, the filtrate acidulated with dilute sulphuric acid (not hydrochloric) and shaken with ten volumes of chloroform The chloroform fraction is then filtered through a chloroform moistened double hard filter to eliminate suspended water particles and their solutes This chloroform extract may then be tested directly, or if it contains only small amounts of barbiturates it may be concentrated over a water-bath

When dealing with urines in which the barbiturates are present in high dilutions it is advisable to add enough powdered copper sulphate crystals to make a 5 per cent solution and thus avoid an increase in the volume of urine to be extracted

Blood

1 Sodium Tungstate Method—The Folin-Wu standard blood precipitation method, using sodium tungstate and $^2/_3$ normal sulphuric acid, can be successfully adapted for the extraction of barbiturates It was found, however, that dilution hemolysis was not necessary The procedure is as follows

Ten cc of blood, 10 cc of 10 per cent sodium tungstate solution and from 10 to 20 cc of $^2/_3$ normal sulphuric acid are shaken in a separatory funnel until a chocolate brown color is obtained The mixture is filtered with suction and an aliquot of the clear filtrate is shaken with ten volumes of chloroform

Ten mg of sodium barbital were added to 20 cc of dog's blood From 90 8 to 93 7 per cent of the barbital was recovered by this method

2 Myers and Wardell's Method (Adopted)—The method used by Myers

* Scientific Section, A PH A, Washington meeting 1934

and Wardell (2) for the extraction of blood cholesterol can be used for the recovery of barbiturates from blood

A convenient amount of blood (1 to 2 cc) is pipetted into a small mortar containing a sufficient amount of plaster of Paris to form a dry mixture The mixture is pulverized and transferred to a paper extraction shell This shell is inserted into a perforated glass tube enclosed in a flask and connected to a reflux condenser Ten volumes of chloroform (10 to 20 cc) are poured into the flask, and boiled over a water bath for half an hour The chloroform extract is then filtered and tested If the test is negative the extract may be concentrated over a water-bath and again tested

Ten mg of sodium barbital added to 20 cc of blood gave recoveries of from 88 0 to 92 7 per cent

This method is particularly valuable when only 1 or 2 cc of blood can be secured It may also be used for small quantities of urine or for liquefied tissues

Tissues

1 *Copper Sulphate Precipitation Method* —The weighed organs are ground and thoroughly mixed with a 5 per cent sodium hydroxide or potassium hydroxide solution of a volume sufficient to liquefy the organs within twenty-four hours Then the alkalinized liquefied organs or known portions thereof are shaken with an equal volume of 10 per cent copper sulphate solution and filtered until clear The filtrate is acidulated with dilute sulphuric acid and shaken with ten volumes of chloroform

Another equally simple procedure consists of mixing the ground organs with pepsin and a 3 per cent solution of hydrochloric acid, and allowing the mixture to stand for twenty-four hours This mixture is shaken with an equal amount of copper sulphate solution (10 per cent) after its reaction has been made alkaline by adding sufficient amounts of potassium hydroxide or sodium hydroxide It is then filtered and extracted with ten volumes of chloroform

2 *Liquid Air Method* —It has been found possible to extract barbiturates from tissues which have been pulverized after being frozen with liquid air

The organ or tissue is weighed, placed in a pyrex beaker, liquid air is poured over the tissue until it is frozen It is then pulverized, and a convenient amount of this pulverized material is weighed and placed in a separatory funnel and shaken with 10 cc of chloroform per Gm of tissue The chloroform extract must be filtered before it is tested If necessary, the chloroform extract may be concentrated over a water-bath

Frogs were injected with 1 mg of barbital per Gm of body weight After ten minutes they were frozen in liquid air and the barbital extracted as described Recoveries were from 83 0 to 91 0 per cent

This liquid air method is of special value where rapidity is desired It can be satisfactorily applied to every organ and tissue except the brain and spinal cord The brain and spinal cord must be liquefied with alkali and precipitated with copper sulphate before they can be successfully extracted with chloroform With brain tissue as with other tissues, excess alkali causes pigments to be carried over into the chloroform extract These pigments may interfere with the colors formed in the test

II METHODS OF COLORIMETRY

The Macro Test —In all experiments we extracted the appropriately treated unknown solution by shaking with ten volumes of chloroform in a suitable separatory funnel All chloroform extracts are filtered through a chloroform-moistened filter until clear The colorimetric estimation of barbiturates is always carried out with portions of the chloroform extract

To perform the test 6 cc of an extract are divided into three equal volumes and placed in test tubes called A, B and C To A is added 0 05 cc of 1 per cent cobaltous acetate solution in absolute methyl alcohol and 0 1 cc of 1 per cent barium hydroxide solution in absolute methyl alcohol To B are added 0 1 cc of the cobalt reagent and 0 2 cc of the barium hydroxide reagent To C are added 0 2 cc of the cobalt reagent and 0 4 cc of the barium reagent A blue color indicates a positive test

If malonyl-urea derivatives are present in the extracts a blue color appears in A, may appear in B or even in C If only A gives a blue color the solution contains more than 0 09 mg but less then 0 2 mg of barbiturate per cc If B also yields a blue color, the extract contains 0 3 mg per cc or less, if A, B and C turn blue, the extract contains 0 3 mg per cc or more However, if one allows these colors to stand for five minutes the color of C will fade if the extract contains less than 0 30 mg per cc Chloroform extracts containing less than 0 2 mg per cc become positive, but turn quickly negative when treated as B, but remain positive (blue) when treated as A Also chloroform extracts containing 0 25 to 0 30 mg of barbital per cc when treated like C turn positive but fade from blue to greenish yellow However, they remain positive if treated like A and B Chloroform extracts containing 0 35 mg of barbital per cc or more if treated as C, remain positive

Positive tubes are then compared with standards, within the range of the positive tubes, treated similarly

Not only alcoholic solutions of barium hydroxide, but also any anhydrous alkaline solution, as sodium, magnesium or potassium hydroxide will provide a medium for the test We have investigated these, as well as sodium, magnesium and calcium methoxide, and also ammonia in methyl alcohol The colors produced in these solutions are unstable and unsuited for finer colorimetric comparisons Solutions of calcium and magnesium methoxide cannot be prepared in suitable concentrations for the test The best alkalies are barium and lithium hydroxide [1]

The test using barium hydroxide is directly sensitive to one part of barbital in ten thousand parts of solutions We shall call this the *macro test* The test using lithium hydroxide we shall call the *micro test* This test is sensitive to one part of the barbital in one hundred thousand parts of solution Since chloroform extracts can be concentrated at least twenty times, the micro method can detect one part in two million

Amines were found to provide a suitable alkaline medium for the test The colors produced were unusually stable, fading only after several days Thus they are well adapted for use in standard colorimeters We investigated isobutyl amine, isoamylamine, normal butylamine, propanol amine, isopropylamine, hexamethylenetetramine and naphthylamine Only the primary saturated amines were found to be of value, of these isopropylamine produced the most readable color

[1] The sodium salt of evipal (*N* methyl-cyclohexenyl methyl malonyl urea) is fairly soluble in chloroform, and will yield a positive test with cobaltous acetate in anhydrous media without the otherwise necessary addition of the alkaline reagent However, *N*-methyl-cyclohexenyl methyl malonyl urea itself can be tested in the usual way, but about ten times as much must be used as of the other barbiturates, both in the macro and micro tests Thus it seems that the substitution of alkyl radicals on the nitrogen considerably desensitizes the test

THE MICRO TEST

Reagents

Cobaltous Acetate 0 20%—Two hundred mg of the salt is weighed accurately and placed in a volumetric flask and enough absolute methyl alcohol is added to make 100 cc of solution

Lithium Hydroxide 0 20%—Two hundred mg of the chemically pure, dry material is placed in a 100 cc -volumetric flask and about 50 cc of absolute methyl alcohol added to it The flask is gently warmed on a water-bath to facilitate solution It is allowed to cool and the volume made up to 100 cc A small amount of insoluble material is present This amounts to about 0 5% It does not interfere with the test and may either be left in the reagent or filtered out Due to the insoluble material, this reagent is not quantitatively 0 20% but is about 0 199% This difference is not serious

The Standards

Barbital is dissolved in chloroform to give solutions of the following concentrations

0 002% 0 003% 0 004% 0 005% 0 006% 0 007%

These are prepared by first making a 0 1% solution of barbital in chloroform and then, by proper dilutions, preparing solutions of the above concentrations

The standards are kept in glass-stoppered bottles and evaporation avoided

Procedure

Six cc of the chloroform extract are divided in three equal parts A, B and C

The cobaltous acetate reagent is added to each of the three test-tubes, 0 05 cc to A, 0 1 cc to B and 0 15 cc to C

The tubes are shaken and the lithium hydroxide reagent is added to the tubes 0 05 cc to A, 0 1 cc to B and 0 15 cc to C The tubes are shaken and the colors noted against a plain white background The tubes should be observed for one minute before a final reading is made

TABLE I—COLORS APPEARING IN THE DIFFERENT TUBES WITH DIFFERENT CONCENTRATIONS OF BARBITAL

Concentration of Barbital Mg per Cc.	A 0 05 Cc. of Each Reagent.	B 0 1 Cc. of Each Reagent.	C. 0 15 Cc. of Each Reagent.
0 02	Positive	Negative	Negative
0 03	Positive	Positive, fading in 30 seconds	Fades immediately
0 04	Positive	Positive	Fades in 30 seconds
0 05	Positive	Positive	Fades in about 2 minutes
0 06	Positive	Positive	Permanent for more than 2 minutes

If a permanent blue (color persisting more than 2 minutes) is secured in Tube C, and the other tubes have also shown blue, the concentration is above the range of the test The chloroform extract should then be diluted and the test repeated

If no color is secured with the original extract, a convenient amount should be evaporated to dryness in an evaporating dish on a water-bath and the residue dissolved with chloroform The test is repeated with this concentrated solution

The blue colors are faint, but quite distinct We recommend a series of experiments with the standards before actual extracts are used

The principal error is in reading the different intensities of color For example, if a blue is obtained in Tubes A and B but not in Tube C the actual concentration may be within a range between 0 035 and 0 045 It is possible, however, by standard solutions, to estimate concentration between the extremes of the range

ISOPROPYLAMINE TEST

Reagents

Cobaltous Acetate 1 00% —One Gm of cobaltous acetate is weighed accurately and placed in a volumetric flask Enough absolute methyl alcohol is added to make 100 cc of solution

Isopropylamine 5 00% —Five cc of isopropylamine (Research Laboratories, Eastman Kodak Company) are dissolved in sufficient absolute methyl alcohol to make 100 cc of solution

Standards

The barbiturate is dissolved in chloroform to give solutions of the following concentrations

0 02% 0 04% 0 06% and 0 08%

These standards are kept in glass-stoppered bottles and evaporation is avoided

Procedure

One cc of the chloroform extract is placed in a test tube and 0 05 cc of the cobaltous acetate reagent and 0 3 cc of the isopropylamine reagent is added If barbiturates are present in the extract a reddish violet color develops This is then compared in the micro cups of a colorimeter with the color produced under the same conditions by one of the standards

A simple formula giving the concentration in mg of the barbiturate per cubic centimeter of chloroform extract is

$$\frac{\text{Reading of standard} \times \text{Concentration of standard (mg per cc)}}{\text{Reading of unknown}} = \text{Milligrams of barbiturate per cubic centimeter of extract}$$

III DISCUSSION

The three tests described above are identical as far as their specificity is concerned Of chloroform-soluble substances only theobromine, theophylline and thymine show positive tests Other compounds of similar configurations, such as uracil, alloxan and tricarbonimid, are automatically eliminated due to their insolubility in chloroform No substance has been found which in the urine, blood or tissue either positively or negatively interferes with these tests, with the exception of lecithin or lecithin-like substances (3)

It is noteworthy that the lithium test can be performed only in chloroform solution If the barbiturates are dissolved in absolute methyl alcohol and treated with the cobaltous acetate and lithium hydroxide reagents the color does not develop The barium hydroxide and isopropylamine are effective in absolute alcohol, chloroform and ether

REFERENCES

(1) Koppanyi, Murphy and Krop, *Arch intern Pharm Therap* 46 (1933), 76
(2) Myers and Wardell, *J Biol Chem*, 36 (1918), 147
(3) Koppanyi, Dille Krop, *J Pharmacol and Exper Therap* 52 (1934), 121

DEPARTMENT OF PHARMACOLOGY AND MATERIA MEDICA,
GEORGETOWN UNIVERSITY, SCHOOL OF MEDICINE

STUDIES ON BARBITURATES III CHEMICAL ASSAY OF BARBITURATES *

BY JAMES M DILLE AND THEODORE KOPPANYI [1]

In a previous paper Koppanyi, Murphy and Krop (1) presented a modification of their original quantitative barbiturate test (2) using cobaltous acetate and isopropylamine dissolved in absolute methyl alcohol as reagents This test was utilized in the following work as a method of chemical assay of various preparations containing barbiturates

EXPERIMENTAL

The test depends upon the formation of a bluish or reddish purple color produced by cobaltous acetate in an alkaline medium when barbiturates are present The barbiturate to be assayed is either directly dissolved in chloroform or extracted with chloroform from an aqueous solution To 2 cc of this chloroform solution are added 0 1 cc of 1 00 per cent cobaltous acetate ($CO(CH_3COO)_2 4H_2O$) in absolute methyl alcohol and 0 6 cc of a 5 00 per cent (by volume) solution of isopropylamine in absolute methyl alcohol A reddish violet color develops which is compared in a standard colorimeter with the color produced by a standard made up of the barbiturate under consideration

As is generally the case with colorimetric tests, the concentration of the standard must be near that of the unknown In order to select such a standard a rough approximation of the strength of the unknown is first made Two cc of each of the following solutions of the barbiturate in chloroform are placed in test-tubes 0 040%, 0 060%, 0 080%, 0 100% and 0 120% To each tube 0 1 cc of cobaltous acetate reagent and 0 6 cc of isopropylamine reagent are added The tubes are then stoppered and set aside The unknown solution treated similarly is then compared with the color of the standards, and a standard close to the unknown is chosen The series of color standards can be kept for several hours in stoppered test-tubes

If the concentration is above the range of the standards, the unknown solution may be diluted to bring it within the range covered by the series of standards If it is weaker, it may be concentrated by evaporation on a water-bath

After a standard has been chosen, 2 cc each of the standard solution and the unknown are placed in two test-tubes The reagents are added and the standard and unknown are compared in the microcups of a standard colorimeter

---

* Scientific Section, A PH A Washington meeting, 1934

[1] From the Department of Pharmacology and Materia Medica, Georgetown University School of Medicine Washington D C

The amount of the barbiturate in the original sample can be calculated by the following formula

$$\frac{\text{Reading of standard} \times \text{Concentration of standard (mg per cc)} \times \text{Salt correction factor} \times \text{Cubic centimeters of chloroform extract}}{\text{Reading of unknown}} = \text{Milligrams of barbiturate in sample.}$$

The salt correction factor is applied in cases where the salt of a malonyl urea derivative is being assayed It is found by dividing the molecular weight of the salt by the molecular weight of the acid form of the barbiturate

If the barbiturate is soluble in chloroform the assay is made by simply dissolving an accurately weighed amount in chloroform This solution is then compared with standards as described

Preparations of barbiturates such as tablets or capsules which contain inert substances to provide bulk, can be best assayed by first dissolving the tablet or the contents of the capsule in a small amount of water in a separatory funnel, and then extracting this aqueous solution or suspension with chloroform If the barbiturate is in the form of its salt the aqueous portion must always be acidulated with 5 per cent sulphuric acid This converts the salt into a form which is soluble in chloroform Three extractions should be made The first with a volume of chloroform approximately five times that of the aqueous volume, the second and third with a volume of chloroform equal to twice the aqueous volume The chloroform extracts are drawn off from the separatory funnel and filtered through a small filter into a volumetric flask of a size to hold ten times the volume of water used Chloroform is washed through the filter to make up to the final volume

Elixirs or solutions of barbiturates are pipetted into a separatory funnel and extracted with chloroform as above For barbital there is a theoretical extraction of 99 48 per cent by this procedure

Accuracy of Procedure—With a view of determining the error of reading the colors and the amount of loss by the various extractive or other manipulations, a series of experiments with barbiturates of known concentrations was undertaken The various barbiturates used were in most cases furnished in a pure form through the kindness of the manufacturers Nitrogen determinations by the Kjeldahl method indicated that all of the samples of barbiturates used were close to 100 per cent purity They were kept in a desiccator, and solutions were made up immediately before use The error of making up the solutions and preparing them for colorimetric determinations was within the allowable error for analytical work

Experiments were first carried out using chloroform solutions of the barbiturates A number of solutions of different concentrations were tested against standards, the concentrations of which lay close to that of the solution being tested Results are summarized in Table I These show the sources of error which may be expected from the assay of barbiturates by this procedure It can be seen that there are two sources of error in this procedure *First*, the error that results from matching the colors in the colorimeter, and, *second*, the error that occurs when the concentration of the standard is not close to that of the unknown

TABLE I —RECOVERY OF BARBITURATES FROM CHLOROFORM SOLUTIONS

Barbiturates	Concentration of Sample Gm. per 100 Cc.	Concentration or Standard Gm. per 100 Cc.	Recovery Average of 3 Determinations	Per Cent Recovery
Barbital	0 040	0 060	0 0429	107 1
Barbital	0 060	0 060	0 0594	99 0
Barbital	0 080	0 060	0 0763	95 5
Phenobarbital	0 060	0 080	0 0655	108 3
Phenobarbital	0 080	0 080	0 0816	102 0
Phenobarbital	0 100	0 080	0 0935	93 5
Amytal	0 100	0 120	0 1042	104 2
Amytal	0 120	0 120	0 1216	100 5
Amytal	0 140	0 120	0 1309	93 5

Other experiments in which aqueous solutions of water-soluble barbiturates were extracted with chloroform are embodied in Table II Sodium barbital for example was dissolved in water, acidulated and extracted with chloroform In addition to the two sources of error given above, there is now an additional possibility of loss in the extraction process

TABLE II —RECOVERIES OF BARBITURATES FROM AQUEOUS SOLUTIONS

Barbiturate	Concentration of Aqueous Solution Per Cent	Amount of Solution Extracted Cc.	Amount of Barbiturate in Sample Gm.	Final Volume of Chloroform Extract Cc.	Recovery Average of 3 Determinations Gm	Per Cent Recovery
Sodium barbital	1 000	10	0 100	100	0 0982	98 2
Sodium phenobarbital	1 000	10	0 100	100	0 1010	101 0
Sodium phenobarbital	0 800	10	0 080	100	0 0785	98 1
Sodium ortal	0 800	10	0 080	100	0 0753	94 1

We prepared powders in which barbiturates were mixed with lactose These powders were then placed in a separatory funnel, dissolved in water and extracted with chloroform The results of this type of assay are embodied in Table III

TABLE III —RECOVERIES OF BARBITURATES FROM POWDERS MADE WITH LACTOSE

Barbiturate	Amount of Drug in a 1 Gm Sample Gm.	Amount of Water Cc	Volume of Chloroform Extract Cc	Recovery Average of 3 Determinations Gm.	Per Cent Recovery
Sodium phenobarbital	0 100	10	100	0 0974	97 4
Sodium phenobarbital (gr IV saccharine added)	0 100	10	100	0 0973	97 3
Phenobarbital	0 100	10	100	1 0041	100 4
Phenobarbital	0 080	10	100	0 0815	101 9
Amytal	0 060	10	100	0 0582	97 0
Amytal	0 080	10	100	0 0744	93 0
Neonal	0 080	10	100	0 0764	95 5
Sodium barbital	0 120	10	100	0 1130	94 2
Phanodorn	0 100	10	100	0 0990	99 0

We believe that with careful manipulation, and with the choice of a proper standard this assay can be performed with an error of not more than 6 per cent

Specificity of the Test—Of chloroform-soluble substances, theobromine theophylline and thymine show a positive test Certain urea derivatives such as biuret and oxamide give positive tests but do not enter into the chloroform frac-

tions in detectable mounts Guanidine and creatinine give a positive test in alcoholic solutions only

None of the common drugs which are combined with the barbiturates in the proprietary preparations investigated interfere with this test

Pharmaceutical Applications—Using this test we assayed a number of barbiturate preparations purchased on the open market Tablets, capsules and elixirs were assayed by this method These preparations are usually mixed with some inert substance to provide bulk for the preparation, or are fixed mixtures

The results of these determinations are embodied in Table IV It can be seen that some of these proprietary preparations tested do not come up to the strength stated on the label

TABLE IV—AN INVESTIGATION OF SOME PROPRIETARY BARBITURATE PREPARATIONS

Barbiturate	Type of Preparation	Amount of Barbiturate in Sample from Label Grams	Grams	Amount Found Average of 5 Determinations	Per Cent of Labeled Amount	Variation
Sodium veronal	Tablet	5	0 3240	0 3101	95 6	93 5 to 98 9
Veronal	Tablet	5	0 3240	0 2759	84 8	82 1 to 90 8
Amytal	Tablet	1½	0 0972	0 0922	94 7	93 5 to 95 7
Amytal	Capsule (with amidopyrine)	1½	0 0972	0 0915	94 5	87 1 to 98 9
Sodium luminal	Tablet	1½	0 0972	0 0812	83 6	82 3 to 84 6
Luminal	Elixir	¼ gr in 4 cc	0 0405	0 0388	95 8	94 1 to 99 0
Veronal	Elixir	2 gr in 4 cc	0 1665	0 1020	61 4	58 5 to 63 3
Novasurol	10% solution in ampul		0 300	0 1878	62 5	57 6 to 69 0

This method of assay is not limited to malonyl-urea hypnotics Novasurol, for example, a commonly used mecurial diuretic composed of diethyl barbituric acid and mercurichlorphenyl oxyacetate may also be assayed by this method In the presence of an acid this compound is broken down, and diethyl barbituric acid is liberated This may then be extracted and estimated From the amount of barbital present the amount of novasurol can be calculated by multiplying the amount of barbital in Gm by the factor 3 211

Correlation of Color with Molecular Weight—In a previous paper (2) it was postulated that the color-giving portion of barbiturate molecule is the malonyl urea residue in which case we would expect the intensity of color to vary with the amount of malonyl urea present The increase in molecular weight among the commonly used barbiturates is not due to a change in the malonyl-urea residue but to the alkyl radicals attached to the central carbon atom Thus solutions of barbiturates of equal percentage should show intensities varying inversely as the molecular weight, whereas equimolar solutions of different barbiturates should show close agreement in color depth

A 0 5 per cent solution of barbital was used as a standard against which other barbiturates of the same concentration were compared The barbiturates used were the pure dried substances and were dissolved in chloroform immediately before use Pernoston and nostal being difficulty soluble in chloroform were dissolved in absolute methyl alcohol in which case the barbital standard was also made up in absolute methyl alcohol

The comparison of barbiturate solutions of different molecular weight but equal concentrations verified the assumption that the depth of color of these solutions would vary inversely as the molecular weight Thus a 0 1 per cent solution of pernoston when compared with 0 1 per cent solution of barbital appeared much lighter in color Due to the great difference in the molecular weights of these two compounds (barbital equals 184 112, pernoston equals 303 052) it was necessary to use barbital in 0 05 per cent solution in order to get an accurate reading of the two colors

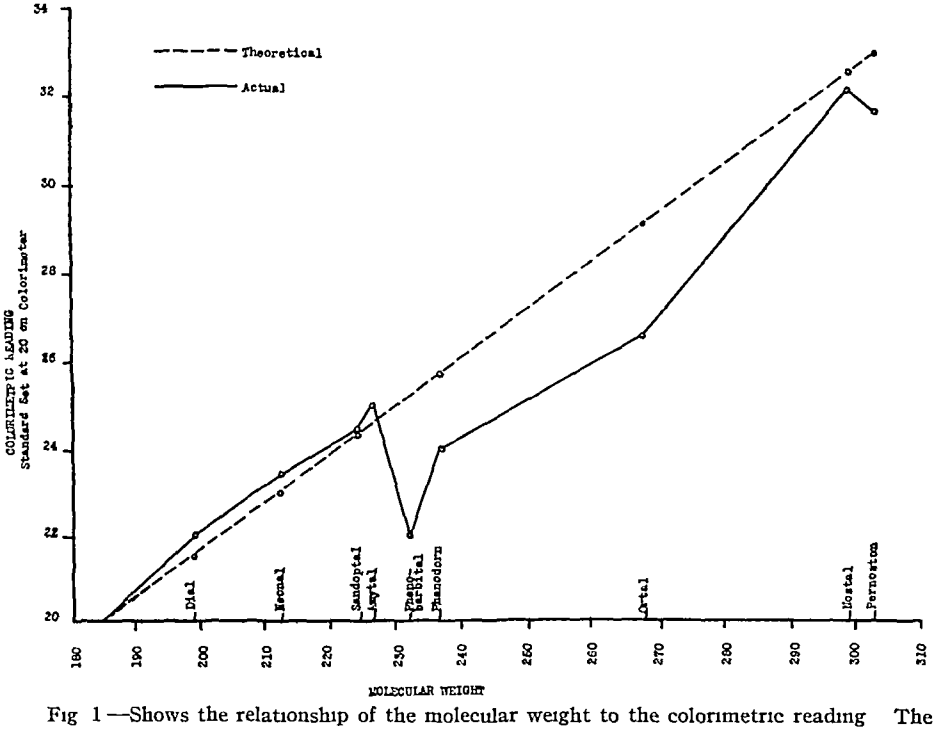


Fig 1—Shows the relationship of the molecular weight to the colorimetric reading The actual colorimetric readings of the different barbituric acid derivatives, with a few exceptions almost coincide with the line representing the theoretical reading

The experiments as summarized in Table V, indicate that the theoretical prediction, namely, that the depth of color will vary inversely with the molecular weight is fulfilled by the different barbiturate derivatives, with the exception of phenobarbital, phanodorn and ortal

It is possible to determine in a general way the molecular weight of an unknown barbiturate if it is in the pure dry state Using the barbital as a standard the difference in depth of color indicates whether the molecular weight is near or far from the molecular weight of barbital

SUMMARY

1 The isopropylamine quantitative barbiturate test was utilized in assaying pharmaceutical preparations containing malonyl-urea derivatives

2 This colorimetric chemical assay is accurate within 6 per cent

tions in detectable mounts Guanidine and creatinine give a positive test in alcoholic solutions only

None of the common drugs which are combined with the barbiturates in the proprietary preparations investigated interfere with this test

Pharmaceutical Applications—Using this test we assayed a number of barbiturate preparations purchased on the open market Tablets, capsules and elixirs were assayed by this method These preparations are usually mixed with some inert substance to provide bulk for the preparation, or are fixed mixtures

The results of these determinations are embodied in Table IV It can be seen that some of these proprietary preparations tested do not come up to the strength stated on the label

TABLE IV—AN INVESTIGATION OF SOME PROPRIETARY BARBITURATE PREPARATIONS

Barbiturate	Type of Preparation	Amount of Barbiturate in Sample from Label Grams	Amount Found Average of 5 Determinations Grams	Per Cent of Labeled Amount	Variation
Sodium veronal	Tablet	5	0 3240	0 3101	95 6	93 5 to 98 9
Veronal	Tablet	5	0 3240	0 2759	84 8	82 1 to 90 8
Amytal	Tablet	1½	0 0972	0 0922	94 7	93 5 to 95 7
Amytal	Capsule (with amidopyrine)	1½	0 0972	0 0915	94 5	87 1 to 98 9
Sodium luminal	Tablet	1½	0 0972	0 0812	83 6	82 3 to 84 6
Luminal	Elixir	¼ gr in 4 cc	0 0405	0 0388	95 8	94 1 to 99 0
Veronal	Elixir	2 gr in 4 cc	0 1665	0 1020	61 4	58 5 to 63 3
Novasurol	10% solution in ampul		0 300	0 1878	62 5	57 6 to 69 0

This method of assay is not limited to malonyl-urea hypnotics Novasurol, for example, a commonly used mecurial diuretic composed of diethyl barbituric acid and mercurichlorphenyl oxyacetate may also be assayed by this method In the presence of an acid this compound is broken down, and diethyl barbituric acid is liberated This may then be extracted and estimated From the amount of barbital present the amount of novasurol can be calculated by multiplying the amount of barbital in Gm by the factor 3 211

Correlation of Color with Molecular Weight—In a previous paper (2) it was postulated that the color-giving portion of barbiturate molecule is the malonyl-urea residue in which case we would expect the intensity of color to vary with the amount of malonyl urea present The increase in molecular weight among the commonly used barbiturates is not due to a change in the malonyl-urea residue but to the alkyl radicals attached to the central carbon atom Thus solutions of barbiturates of equal percentage should show intensities varying inversely as the molecular weight, whereas equimolar solutions of different barbiturates should show close agreement in color depth

A 0 5 per cent solution of barbital was used as a standard against which other barbiturates of the same concentration were compared The barbiturates used were the pure dried substances and were dissolved in chloroform immediately before use Pernoston and nostal being difficulty soluble in chloroform were dissolved in absolute methyl alcohol in which case the barbital standard was also made up in absolute methyl alcohol

The comparison of barbiturate solutions of different molecular weight but equal concentrations verified the assumption that the depth of color of these solutions would vary inversely as the molecular weight Thus a 0 1 per cent solution of pernoston when compared with 0 1 per cent solution of barbital appeared much lighter in color Due to the great difference in the molecular weights of these two compounds (barbital equals 184 112, pernoston equals 303 052) it was necessary to use barbital in 0 05 per cent solution in order to get an accurate reading of the two colors

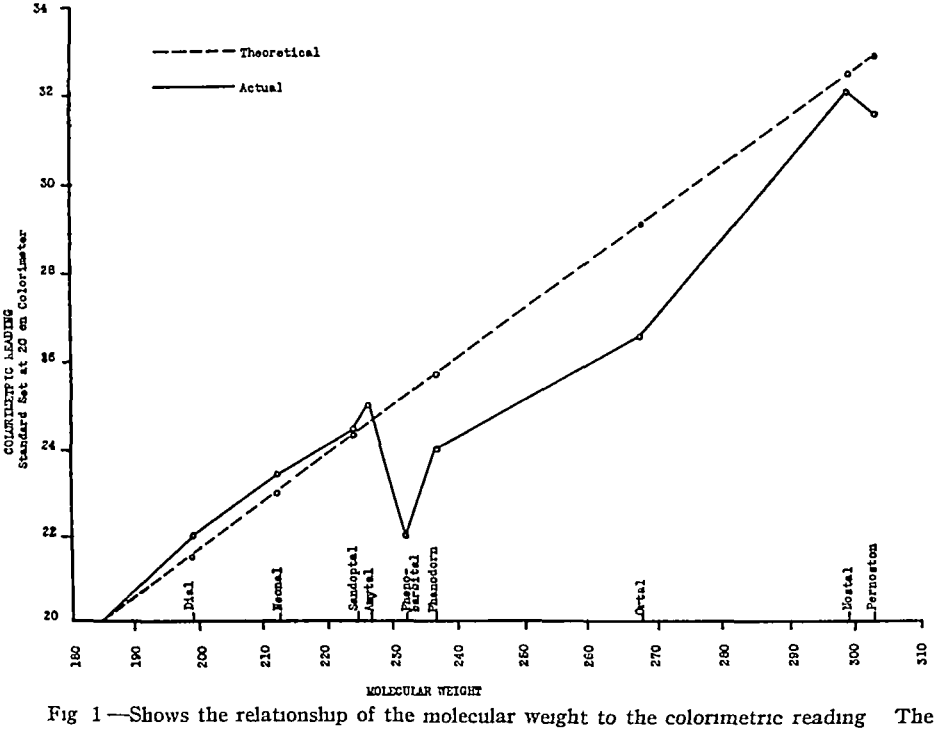


Fig 1—Shows the relationship of the molecular weight to the colorimetric reading The actual colorimetric readings of the different barbituric acid derivatives with a few exceptions almost coincide with the line representing the theoretical reading

The experiments as summarized in Table V, indicate that the theoretical prediction, namely, that the depth of color will vary inversely with the molecular weight is fulfilled by the different barbiturate derivatives, with the exception of phenobarbital, phanodorn and ortal

It is possible to determine in a general way the molecular weight of an unknown barbiturate if it is in the pure dry state Using the barbital as a standard the difference in depth of color indicates whether the molecular weight is near or far from the molecular weight of barbital

SUMMARY

1 The isopropylamine quantitative barbiturate test was utilized in assaying pharmaceutical preparations containing malonyl-urea derivatives

2 This colorimetric chemical assay is accurate within 6 per cent

TABLE V —RELATION OF DEPTH OF COLOR TO MOLECULAR WEIGHT

Barbiturate	Chemical Structure.	Molecular Weight.	Theoretical Reading Standard at 20	Actual Reading Standard at 20
Barbital	Diethyl barbituric acid	184 112	20 0	20 0
Dial	Diallyl barbituric acid	198 112	21 5	22 2
Neonal	*n*-Butyl-ethyl barbituric acid	212 144	23 0	23 4
Sandoptal	Iso butyl allyl barbituric acid	224 144	24 3	24 5
Amytal	Isoamyl ethyl barbituric acid	226 160	24 6	25 0
Phenobarbital	Phenyl ethyl barbituric acid	232 112	25 2	22 0
Phanodorn	Cyclohexenyl ethyl barbituric acid	236 141	25 7	24 0
Ortal	*n*-Hexyl ethyl barbituric acid	268 202	29 1	26 5
Nostal	Isopropyl bromallyl barbituric acid	289 036	31 4	32 0
Pernoston	Sec butyl bromallyl barbituric acid	303 052	33 0	31 5

3 Some of the proprietary barbiturate preparations investigated did not come up to the strength stated on the label

4 The isopropylamine test for barbiturates is sensitive enough for an approximation of the molecular weight of different barbiturates

BIBLIOGRAPHY

(1) Koppanyi, Murphy and Krop *Proc Exp Biol and Med*, 31 (1933) 373
(2) Koppanyi Murphy and Krop, *Arch intern Pharm Therap*, 46 (1933), 76

A NEW METHOD OF DETERMINING ACETYLSALICYLIC ACID IN THE PRESENCE OF MEDICINAL PRODUCTS *

BY RICHARD M HITCHENS

Acetylsalicylic acid is employed so extensively in pharmaceutical preparations that its estimation in such mixtures is of considerable importance

Many methods have been proposed for its determination The association of Official Agricultural Chemists has carried out several systematic investigations and has proposed several methods of analysis (1) One method, applicable in the absence of acidic or basic substances, consists of titrating a cold alcoholic solution of the acetylsalicylic acid with standard alkali to a phenolphthalein end point, thus neutralizing the free carboxyl group present in the molecule, then adding excess of standard alkali to hydrolyze the sodium acetylsalicylate to sodium salicylate and sodium acetate, and back titrating to a phenolphthalein end-point The original titration to phenolphthalein should be exactly one-half of the total titration Another method consists of a chloroform extraction of the acetylsalicylic acid from a water suspension, or a dry chloroform extraction of alkaline excipients is present After removal of the chloroform the acetylsalicylic acid is determined as such if no other chloroform-soluble substances are present Otherwise it is hydrolyzed to salicylic and acetic acids The salicylic acid thus obtained is determined either by volumetric bromination to tribromphenol or gravimetrically by alkaline iodination to the complex $(C_6H_2I_2O)x$, structure uncertain

In none of the methods found in the literature is acetylsalicylic acid itself separated from other organic substances and determined as such Such a method,

* Scientific Section, A PH A, Washington meeting, 1934

if feasible, would allow direct determination and positive identification of the acetylsalicylic acid Present methods allow only its indirect identification

It should be possible to separate acetylsalicylic acid from many organic compounds by extracting its chloroform solution with a dilute solution of sodium bicarbonate, thus forming the water-soluble sodium salt of acetylsalicylic acid, acidifying, reextracting with a suitable solvent and weighing the acetylsalicylic acid after evaporating the solvent at a low temperature

The most apparent objection to this procedure is the ease with which acetylsalicylic acid hydrolyzes to form acetic and salicylic acids, especially in neutral or alkaline solutions

Several investigators have studied the rate of hydrolysis of acetylsalicylic acid in aqueous solution Tsakalatoos and Horsch (2) found that complete hydrolysis occurs in aqueous solution at room temperature in about one hundred days Germuth (3) found about 10% hydrolysis to occur at room temperature in 24 hours, using as a solvent 90% ethyl alcohol, 10% water or 90% glycerol, 10% water Morton (4) found that hydrolysis occurs to the extent of 10% in 24 hours at room temperature in aqueous solutions containing alkali citrates or acetates

Dott (5) found that acetylsalicylic acid could be dissolved in dilute sodium bicarbonate solution, the solution acidified, the acetylsalicylic acid extracted with a mixture of ether and chloroform, the solvent evaporated and a fairly quantitative recovery of essentially pure acetylsalicylic acid obtained However, if the sodium bicarbonate solution were allowed to stand four hours before acidification and extraction, 4 3% hydrolysis occurred

Experiments were accordingly started in this laboratory to determine the extent to which hydrolysis occurs when acetylsalicylic acid is extracted from chloroform solutions with a dilute sodium bicarbonate solution, the solution acidified, the acetylsalicylic acid reextracted and the solvent removed under reduced pressure The free salicylic acid content of the recovered acetylsalicylic acid was determined colorimetrically by dissolving it in a little alcohol, diluting with water and matching the color produced with ferric ammonium sulphate with that produced by a known amount of salicylic acid If the sodium bicarbonate solution was kept at 20° C for one hour before acidification and extraction, about 0 25% hydrolysis was indicated, if at 30° C , about 0 35% Since the salicylic acid is weighed with the acetylsalicylic acid, this would at the most cause the analysis to be 0 08% low In practice the acetylsalicylic acid need never be in the bicarbonate solution more than 20 minutes, so the error caused by hydrolysis is negligible

After some preliminary experiments, the following procedure was found to give quantitative recovery of acetylsalicylic acid from the chloroform solution

About 0 3 Gm of acetylsalicylic acid, sufficient to minimize the effect of errors in weighing is dissolved in 80 cc of chloroform, approximately the volume resulting from the extraction of acetylsalicylic acid from a sample of tablets The chloroform is extracted with 25 cc of a 2% sodium bicarbonate solution, removed to a second separator, extracted with 20 cc of the bicarbonate solution, and discarded The first bicarbonate extract is washed with four 10 cc portions of chloroform each being used to wash the second bicarbonate extract before discarding This removes traces of chloroform soluble substances from the bicarbonate The bicarbonate extracts are combined and acidified with 1 5 cc of 36% hydrochloric acid (The bicarbonate solution should be kept at 25° C or below and the acetylsalicylic acid should not be allowed to remain in the bicarbonate solution more than one hour) The acidified aqueous layer is extracted

with 40 20, 15, 10 cc of redistilled A R ethyl acetate, in which acetylsalicylic acid is appreciably more soluble than in chloroform each ethyl acetate extract being washed with 2–3 cc of water The ethyl acetate extracts are filtered through a plug of cotton into a small Erlenmeyer flask carefully counterpoised against a similar flask The ethyl acetate is evaporated under reduced pressure This is accomplished quickly and conveniently by connecting the flask directly to a water pump and adjusting the pressure with a screw clamp so that the ethyl acetate barely boils The process is hastened by placing the flask in a large vessel containing water at 40–45° C In this way all ethyl acetate may be removed in 30 minutes The flask is kept under reduced pressure for 15 minutes after the ethyl acetate has evaporated The flask and contents are then dried to constant weight over calcium chloride To insure rapid attainment of constant weight the counterpoise is placed in the water bath during the evaporation

Using this method three analyses of a U S P quality acetylsalicylic acid gave 100 1%, 99 9%, 99 6% recovery In each case the salicylic acid content of the recovered material was less than 0 15% By double titration or by melting point, the recovered acetylsalicylic acid could not be distinguished from the starting product The method is, therefore, quantitative, the errors being of the magnitude expected in such an analysis The time required for an analysis is generally not over $1^1/_2$ hours

The behavior of other compounds when subjected to this procedure was now studied to determine if acetylsalicylic acid can be separated from them by this method The above extraction process was performed with 0 3 Gm of acetphenetidin, caffeine, acetanilid, antipyrine, amidopyrine, phenylsalicylate, respectively, no acetylsalicylic acid being present In no case was a weighable residue of any of the above compounds obtained, indicating that they should not interfere with the analysis for acetylsalicylic acid

A distinct residue was obtained with phenolphthalein present This is to be expected since chloroform is a poor solvent for this compound If after two chloroform extractions of the bicarbonate solutions the latter are combined and extracted once with 25 cc of ethyl acetate, the phenolphthalein is removed quantitatively

TABLE I

Mixture Analyzed. Acetylsalicylic Acid		% Recovery of Acetylsalicylic Acid
0 3 Gm	0 2 Gm acetphenetidin	100 1%
	0 05 Gm caffeine	99 8
0 3 Gm	0 2 Gm acetanilid	99 8
0 3 Gm	0 3 Gm antipyrine	99 8
0 3 Gm	0 3 Gm amidopyrine	100 1
0 3 Gm	0 3 Gm phenylsalicylate	99 7
0 3 Gm	0 1 Gm phenolphthalein	99 6

(Sodium bicarbonate solution extracted with ethyl acetate)

With this modification, phenolphthalein does not interfere with the analysis for acetylsalicylic acid

Mixtures of these compounds and acetylsalicylic acid were analyzed by the above procedure The results are given in Table I The first column gives the composition of the mixture analyzed and the second the percentage recovery of the acetylsalicylic acid The materials used were all of U S P quality A R ethyl acetate was redistilled before use

Each of these separations and determinations of acetylsalicylic acid is quantitative, the errors being within the manipulative errors of the analysis In no case did the acetylsalicylic acid recovered contain over 0 2% free salicylic acid, indicating that the error introduced by hydrolysis of the acetylsalicylic acid is not over 0 05%

The method can be adapted to the determination of acetylsalicylic acid in Tablets by following the A O A C procedure of preliminary extraction of the tablets with chloroform in the presence of a small amount of water or by extraction with dry chloroform if alkaline excipients are present Using 0 3 Gm of acetylsalicylic acid and 0 1 Gm starch it was convenient to extract with 20, 15, 15, 10, 10, 10, 10 cc of chloroform in the presence of 5 cc of water Larger volumes of water or fewer extractions with chloroform gave incomplete extraction This method was tried on two samples of commercial tablets The results are given in Table II

TABLE II

Mixture Analyzed	Recovery of Acetylsalicylic Acid
0 3 Gm acetylsalicylic acid 0 1 Gm corn starch	100 0%
0 3 Gm acetylsalicylic acid 0 1 Gm tapioca starch	99 8%
Commercial Tablets	
3½ grains acetylsalicylic acid	3 41 grains per tablet
2½ grains acetphenetidin	3 40 grains per tablet
½ grain caffeine 0 7-Gm sample	
3½ grains acetylsalicylic acid	
2½ grains acetphenetidin	3 35 grains per tablet
½ grain caffeine	3 35 grains per tablet
¼ grain phenolphthalein	

Again the known mixtures gave quantitative results The acetylsalicylic acid content of the two samples of tablets is slightly lower than stated by the formula However, the analyses check well, and no more acetylsalicylic acid could be detected in any of the extraction layers discarded The materials recovered did not contain over 0 2% of free salicylic acid and were identical with acetylsalicylic acid in melting point and in double titration with alkali

SUMMARY

A method is described whereby acetylsalicylic acid may be separated from many organic compounds and determined directly

The method is rapid and accurate and allows easy identification of the acetylsalicylic acid It is applicable in the presence of all compounds except organic acids which are relatively water insoluble, as for example, barbital, benzoic acid or salicylic acid

REFERENCES

(1) Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists " 3rd Edition (1930)

(2) Tsakalatoos and Horsch, *Bull soc chim* , 15 (1914), 743

(3) Germuth, JOUR A PH A, 20 (1931), 568
(4) Morton, *Quant J Pharm Pharmacol*, 6 (1933) 492
(5) Dott, *Pharm J*, 122 (1929) 302, 355, 124 (1930), 214

ANALYTICAL LABORATORIES,
MONSANTO CHEMICAL COMPANY
ST LOUIS, MISSOURI

ANTHELMINTICS I THE EFFECT OF HYDROGEN PEROXIDE AND SOME OXYGENATED TERPENE HYDROCARBONS UPON *ASCARIS LUMBRICOIDES* *

BY LEWIS W BUTZ AND W A LA LANDE, JR

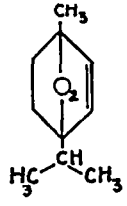
The anthelmintic efficiency of oil of chenopodium in *Ascaris* infections of human beings is well established The oil is also useful in other helminthiases (1) Its high toxicity for the host (2), (3), however, would seem to render unsafe its administration in doses sufficiently large and frequent to insure the desired anthelmintic effect Henry and Paget (4) fractionated chenopodium oil into its constituents These were later (5) examined separately for anthelmintic activity by Smillie and Pessoa who reported that this resided almost entirely in the ascaridole It seems not unlikely that part of the toxicity of chenopodium oil for the human host may be due to the components other than ascaridole, *e g*, cymene and methyl salicylate, but apparently (2) ascaridole itself is quite toxic It would be desirable therefore to study other substances chemically related to ascaridole with the hope of finding one with a higher therapeutic index The work reported here represents the beginning of a proposed extended investigation having this aim in view

The chemical structure of ascaridole (A) seems to be well established by analytic studies (6), (7), (8), although another formula has been suggested (9) It is interesting to consider whether the anthelmintic activity of this substance can be attributed to any one grouping in the molecule or whether this is due to the summation of its chemical and physical characteristics As an approach to a solution of this question the action of hydrogen peroxide and of disuccinyl peroxide (alphozone) upon *Ascaris lumbricoides* has been studied and these substances have been found to be very toxic to the parasites This indicates that the peroxide group, or the hydrogen peroxide or nascent oxygen arising therefrom under various conditions, has in itself pronounced anthelmintic properties These findings logically lead to an examination of other peroxides some of which might have the desired property of low toxicity for the human host, and in addition be sufficiently stable to serve as therapeutic agents administrable *per os*

Peroxides with these characteristics have first been sought among the terpene derivatives It has long been known that terpenes upon exposure to air become altered and that peroxide formation is one of the processes that takes place We have oxygenated a series of commercial and highly purified terpene hydrocarbons In many cases products were obtained which were of the same order of toxicity to *Ascaris* as ascaridole although this toxicity probably cannot be attributed to

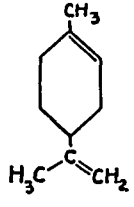
* Scientific Section, A PH A

peroxides The preliminary experiments indicated the wisdom of a more thorough study of α-pinene (B), turpentine (90–95% α-pinene), and *d*-limonene (C) The results of this study are reported in this paper In order to determine whether any of the known oxidation products of these hydrocarbons were responsible for the activity we have tested so far the following compounds Terpineol (D), carvone (E), verbenone (F) and formic acid In addition we have included for comparison bioassay data obtained with chenopodium oil, ascaridole and formaldehyde

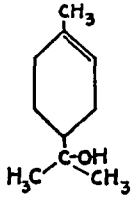


A-*Ascaridole*

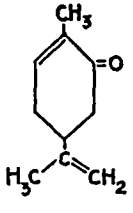
B-α-*Pinene*



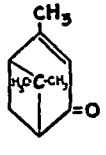
C-*Limonene*



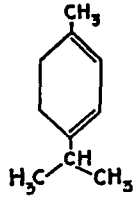
D-*Terpineol*



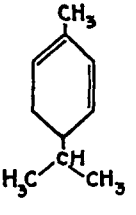
E-*Carvone*



F-*Verbenone*



G-α-*Terpinene*



H-α-*Phellandrene*

EXPERIMENTAL

Materials—Seven specimens of commercial chenopodium oil were tested These were all found to have the same anthelmintic potency and accordingly only one set of data is included in Table I The two samples of ascaridole used in the tests were obtained from Eastman Kodak Co at different times (A and B, Table I) Eighty per cent of B boiled between 92 5–4 5° at 8 mm The hydrogen peroxide solutions were prepared from Merck's superoxol The disuccinyl peroxide was Stearns' alphozone All of the pinene products used in the experiments were prepared from Eastman Kodak practical ' pinene b p 158–161°, the *d* limonene was the best product obtainable from the same source, b p 67–68° at 20 mm , and was redistilled and used without further purification One specimen of turpentine was obtained from a paint dealer (A, Table II), the other (B) was Merck's oil of turpentine U S P X rectified The two samples of terpineol (C and D, Table III) were obtained from Givaudan Delawanna Co and Eastman Kodak Co , respectively, and were used without further purification The carvone b p 113–114° at 16 mm was obtained from Eastman Kodak Co The verbenone, b p 98–101° at 16 mm was prepared from *d* α pinene by oxidation with selenium dioxide according to the method of DuPont *et al* (10) The formic acid solutions were prepared by diluting Eastman Kodak formic acid (98–100%) m p 6–8° The formaldehyde solutions were similarly prepared from Baker s C P 36% The cobalt naphthenate catalyst[1] used in the oxidations was a commercial product Tank oxygen was used for the oxygenations purification was unnecessary since the gas contained only nitrogen and carbon dioxide as impurities

Oxidation of the Terpenes—Thirty-Gm portions of the hydrocarbons were each treated with 0 4 cc of the catalyst (equivalent to 0 05% cobalt) and placed in 250 cc Erlenmeyer flasks which had previously been flushed with oxygen or air The necessary atmosphere was maintained in

[1] Nuodex Cobalt kindly furnished by Oliver Haun D H Litter Co Philadelphia

each flask by passing into it a very slow stream of the oxygen or air The loss by evaporation was inappreciable All the oxidations were carried out at room temperature in diffused light No attempt was made to exclude moisture Although most of the cobalt was precipitated during the oxidation it was nevertheless ascertained by blank experiments that the catalyst had no effect on the worms other than a slight stimulation The oxidation products which were usually yellow and more viscous than the original hydrocarbons, were kept in glass stoppered bottles until needed Active products can also be obtained without the catalyst (No 17 Table II)

Technique of Bioassay—In this work anthelmintic activity toward *Ascaris lumbricoides* was determined by immersion of vigorous specimens in a solution or emulsion of the substance to be tested The apparatus consisted of a rectangular aquarium with glass windows which was filled with water and served as a constant temperature bath An electrical heating unit a thermostat and a mechanical stirrer maintained a uniform temperature of 37 5° ± 0 5° The aquarium was provided with a sheet copper cover containing holes which supported 400-cc beakers of the tall variety Five worms were placed in each beaker which contained 300 cc of the solution or emulsion These were usually females and were always selected for uniformity of size and vigor The worms used were 22–24 cm long and weighed 2 0–2 35 Gm They were all *Ascaris lumbricoides* obtained from the intestines of swine at the abattoir The phenomena observed were the number of minutes after immersion required to produce cessation of normal vermiculatory movements, paralysis and death, respectively For the last two observations it is necessary to remove the worms from the anthelmintic bath for 1–2 minutes This was done about every 50–60 minutes with precaution to avoid changing the environmental temperature Death was determined by means of an inductorium and electrode [2] The worms were observed over a period of 5 hours

When the worms are immersed in some substances rupture of the body wall occurs with extrusion of the viscera Rupture is sometimes accompanied by a detonation Death does not always follow soon after such ruptures Rupture occurred principally with the unoxygenated terpenes and the more concentrated hydrogen peroxide solutions Rigidity and increased pallor often accompany paralysis In one experiment oxygen free nitrogen gas was passed through the beakers containing the worms in water They were apparently unaffected after 5 hours by this oxygen deprivation When nitrogen was passed and the worms were immersed in emulsions of purified pinene the animals were somewhat affected in fact to the same extent as they were when the nitrogen was omitted Thereafter the hydrocarbons were tested without the precaution of using a nitrogen atmosphere

As a method for determining *in vitro* the probable anthelmintic value of a given substance we believe the foregoing procedure has considerable utility It must be emphasized that the parasite for which an anthelmintic is sought and no other should be used in the test This desideratum is almost attained in our method since the swine *Ascaris* is morphologically but not quite physiologically identical with the human *Ascaris* It is not possible, however to use a wholly unrelated species, *e g*, the earth worm, which we have found to be much more susceptible to some substances than *Ascaris* This difference in susceptibility has also been observed by Munch (11) in the case of ethyl alcohol and some samples of chenopodium oil Since, with proper care in handling, the results obtained with *Ascaris* are just as consistent as those obtained in other similar bioassays, there is no need to substitute a less satisfactory animal It is perhaps desirable to add to the anthelmintic bath physiological amounts of substances constantly found in the intestine In the present work these have been omitted for the sake of chemical simplicity Also in most cases no emulsifying agent or other third constituent was ever added the mixtures tested consisting only of the substance or product designated in the table and water The terpineol (Sample D), carvone and verbenone were more difficult to emulsify and some experiments are reported in which 0 1% or 0 2% of acacia gum was added The emulsions were all made in a uniform way by mixing with distilled water in a mechanical shaking machine It might be thought that the anthelmintic potency of a water insoluble material at a given concentration would be related to the degree of dispersion of the material in the water However, it was found that finer emulsions produced by a colloid mill were no more potent than those made with the shaking machine The immersion tests here reported are being supplemented by a study of the

[2] Suggestion of Dr James C Munch

effect of the same substances upon the movements of segments of *Ascaris* as recorded by a kymograph

RESULTS

The bioassay data in Table I show the relative anthelmintic potencies of chenopodium oil, ascaridole, hydrogen peroxide and disuccinyl peroxide as determined by the method just described Although these results demonstrate the high toxicity of hydrogen peroxide to *Ascaris lumbricoides*, it cannot be stated with certainty just how much this finding contributes to an explanation of the anthelmintic action of ascaridole Aqueous emulsions of ascaridole give with a vanadium pentoxide reagent,[1] after 15–20 minutes contact, the same intensity of color as hydrogen peroxide solutions of one-tenth the concentration This color may or may not be due to hydrogen peroxide Ascaridole, in the absence of complicating side reactions, might be expected to yield with water one-fifth its weight of hydrogen peroxide But ascaridole and hydrogen peroxide seem to be of about equal toxicity to *Ascaris*, *i e*, ascaridole is more toxic than would be predicted if its activity were attributed solely to the hydrogen peroxide which it could generate An explanation for this apparent anomaly must be sought by studying the decomposition of ascaridole under very mild conditions such as with water in contact with animal tissues We have found that the hydrogen peroxide equivalent of a 1% ascaridole emulsion (as indicated by the V_2O_5 reaction) decreases very rapidly when successive groups of live *Ascaris* are immersed in the emulsion at 37° C The hydrogen peroxide equivalent of a control emulsion kept at 37° C decreases only slightly in comparison Perhaps the anthelmintic activity of ascaridole is

TABLE I —THE EFFECT OF HYDROGEN PEROXIDE, DISUCCINYL PEROXIDE CHENOPODIUM OIL AND ASCARIDOLE ON *Ascaris lumbricoides* [1]

Substance	Concn %	No of Ascaris	% Paralyzed 2 Hrs	% Paralyzed 3 Hrs	% Killed 3 Hrs	% Killed 4 Hrs
Chenopodium oil	0 4	85	74		75	80
Ascaridole A	0 1	24	100		91	
Ascaridole B	0 1	12	0	91	0	0
Ascaridole B	0 2	27	44	85	52	89
Ascaridole B	0 4	15	87		87	
Hydrogen peroxide	0 033	20	0	0	0	0
Hydrogen peroxide	0 1	32	91		100	
Disuccinyl peroxide	0 2	12	0	100	0	0
Disuccinyl peroxide	1 0	12	100		100	

[1] All the worm tests reported in this paper were carried out by Miss Anna D Ogden of the Jayne laboratory

due in part to decomposition products other than hydrogen peroxide, or perhaps to the simple menthene structure itself Also it may be supposed that the hydrogen peroxide arising from ascaridole is taken up more economically by the worm due to the fact that it is evolved slowly or is stabilized by the presence of the excess ascaridole On the other hand when worms are immersed in pure hydrogen peroxide solutions, a part of the available hydrogen peroxide may be dissipated

[1] Prepared by dissolving 4 Gm of vanadium pentoxide in 40 cc of concentrated sulphuric acid with subsequent addition of enough water to make one liter Two cc of reagent were added to 1 cc of solution or emulsion Under these conditions ascaridole emulsions gave maximum color in about 20 minutes

so far as opportunity to exert toxic action is concerned, *e g*, by combination with unimportant parts of the worm substance or by conversion to molecular oxygen

The results of the worm tests with α-pinene, turpentine, limonene and their oxygenation products are given in Table II It is seen from the table that oxygenated hydrocarbons can be prepared which are just as toxic as chenopodium oil or ascaridole It is also apparent that the optimal conditions for producing these anthelmintic products are not yet worked out In order to find these we are making a systematic study of factors which may affect the autoxidations concerned It would appear likely from a consideration of the experimental procedure that the fraction of non-toxic terpene hydrocarbon converted is very small, and that therefore the toxicity of the substances formed during oxygenation must be very great indeed

TABLE II —THE EFFECT OF VARIOUS TERPENE SUBSTANCES ON *Ascaris lumbricoides*

Substance	Preliminary Treatment	Time of Oxidation in Hrs By O_2	Time of Oxidation in Hrs By Air	Concn %	No of Ascaris	% Paralyzed 2 Hrs	% Paralyzed 3 Hrs	% Killed 3 Hrs	% Killed 4 Hrs
Pinene	None			0 4	24	0	4	0	0
Pinene	None			0 8	24	0	0	0	0
Pinene	Distd over Na, stored in N_2			0 4	27	0	37	0	0
Pinene	Distd over Na, stored in N_2			0 8	12	0	50	0	0
Pinene	None	4		0 4	25	0	36	0	0
Pinene	None	20		0 4	25	80		76	92
Pinene	None	70		0 4	25	[1]		80	
Pinene	Distd over Na stored in N_2	20		0 4	22	41	55	0	45
Pinene	Distd over Na, stored in N_2	40		0 4	22	95		0	27
Pinene	Distd over Na, stored in N_2	60		0 4	22	27	82	0	0
Pinene	Distd over Na, stored in N_2	81		0 4	22	27	73	14	23
Pinene	Distd over Na stored in N_2	137		0 4	22	14	73	0	0
Pinene	None		46	0 4	25	84		76	
Pinene	None		113	0 4	15	0	0	0	0
Pinene	None		137	0 4	15	73		0	47
Pinene	None		161	0 4	15	80		60	
Pinene	None		190[2]	0 4	20	100		60	70
Turpentine A	None			0 4	10	70		0	60
Turpentine B	None			0 4	35	0	14	0	0
Turpentine B	None	120		0 4	10	60		0	60
Turpentine B	None		47	0 4	20	0	55	0	0
Turpentine B	None		120	0 4	25	100		80	
d Limonene	None			0 4	17	0	0	0	0
d Limonene	None			0 8	12	0	0	0	0
d-Limonene	None	3		0 4	15	0	0	0	0
d-Limonene	None	20		0 4	40	95		54	80
d Limonene	None	24	21	0 4	25	80		80	

[1] 64% were killed in two hours

[2] No catalyst

The chemical nature of these substances is not yet known Examination reveals that the activity probably cannot be attributed to peroxides These are demonstrable in the oxygenated hydrocarbons but are very quickly decomposed on shaking with water The dilute emulsions which were so toxic to *Ascaris* gave no coloration with the V_2O_5 reagent They therefore contained less than 0 0005% of hydrogen peroxide equivalent Of course it is possible that peroxides are present which do not react with the V_2O_5 reagent under the conditions employed It should be recalled here that Bodendorf (8) obtained peroxides toxic to earth worms by oxygenating α-terpinene (G) and α-phellandrene (H)

TABLE III —THE EFFECT OF TERPINEOL, VERBENONE, CARVONE FORMIC ACID AND FORMALDEHYDE ON *Ascaris lumbricoides*

Substance	Concn %	No of Ascaris	% Paralyzed 1 Hr	2 Hrs	3 Hrs	% Killed 2 Hrs	3 Hrs	4 Hrs.
Terpineol C	0 1	12	0	0	0	0	0	0
Terpineol C	0 2	12	0	100		0	100	
Terpineol D[1]	0 3	25	0	96		0	72	
Terpineol D[2]	0 25	20	0	40	75	0	0	20
Terpineol D[2]	0 5	20	90	95		45	85	
Verbenone	0 1	20	0	0	0	0	0	0
Verbenone	0 2	20	0	75	95	0	5	15
Verbenone	0 3	10	0	80		0	40	60
Verbenone[2]	0 4	20	70	85		25	40	
Verbenone[3]	0 5	20	0	45	75	0	15	25
Carvone	0 2	30	0	67		0	0	0
Carvone	0 3	15	0	67		0	0	45
Carvone	0 4	20	0	90		0	75	
Carvone[2]	0 4	20	65			25	35	45
Carvone[3]	0 5	20	0	80		0	70	
Formic acid	0 1	10	0	0	0[4]	0	0	0
Formic acid	0 5	10	0	20		80	100	
Formaldehyde	0 1	10	0	0	0	0	0	0
Formaldehyde	0 5	10	0	0	0	0	0	0
Formaldehyde	1 0	10	0	0	90	0	0	50

[1] Contained 2% of ethyl alcohol which in itself is not toxic to *Ascaris*

[2] Contained 0 1% of acacia gum [3] Contained 0 2% of acacia gum [4] 30% paralyzed in 4 hrs

We have observed that the oxygenated hydrocarbons give a strong Schiff reaction [1] This is significant since it has been shown (12) that verbenone (F) is formed during the autoxidation of oil of turpentine, and that carvone (E) is similarly produced (13) from limonene Both of these ketones give a positive Schiff reaction We have investigated the effect of verbenone and carvone upon *Ascaris* The results (Table III) show that, while both these substances are quite toxic, their toxicity is not sufficiently great to account for more than a part of the antiascaridic action of our oxygenated hydrocarbons A number of other substances have been identified as products of oxidative transformations of α-pinene and limonene Two of these terpineol (D) and formic acid (14) have been bioassayed

[1] Reagent Aqueous solution of basic fuchsin (0 25 Gm per L) treated with an excess of sulphur dioxide gas One cc of sample was added to 5 cc of reagent and the mixture vigorously shaken

with the results shown in Table III Still others now being prepared will be studied later Since the amount of free acid in the emulsions studied is small (p_H 5 8) it is doubtful how much any free formic acid present contributes to the anthelmintic effect Perhaps renewed analytical investigation of oxygenated α-pinene and oxygenated limonene will give a clue to the identity of these very powerfully antiascaridic substances

SUMMARY

1 Hydrogen peroxide is very toxic to *Ascaris lumbricoides* The relation of this observation to the anthelmintic activity of ascaridole has been discussed

2 By passing oxygen or air over α-pinene, turpentine or *d*-limonene products are formed of pronounced toxicity to *Ascaris lumbricoides* The toxic substances in these products are probably not peroxides

REFERENCES

(1) Faust Human Helminthology," 1929, Lea and Febiger, Philadelphia, pages 273 331, 341, 378, 386, 404

(2) Chandler and Chopra, Anthelmintics and Their Uses,' 1928, Williams and Wilkins, Baltimore, pages 138, 143

(3) Hall and Hamilton, *J Pharmacol*, 11 (1918), 231

(4) Henry and Paget *J Chem Soc*, 119 (1921), 1714

(5) Smillie and Pessoa, *J Pharmacol*, 24 (1924) 359

(6) Nelson *J Am Chem Soc*, 33 (1911), 1404

(7) Wallach, *Ann der Chem*, 392 (1912), 59

(8) Bodendorf *Arch der Pharmazie*, 271 (1933), 1

(9) Thoms and Dobke *Arch der Pharmazie*, 268 (1930), 128

(10) DuPont, *et al Bull soc chim*, 53 (1933), 599

(11) Munch, ' Bioassays," 1931 Williams and Wilkins Baltimore, Table 212, page 742

(12) Blumann and Zeitschel, *Ber*, 46 (1913), 1178

(13) Blumann and Zeitschel *Ibid*, 47 (1914) 2623

(14) Simonsen, "The Terpenes" 1931 1932 Cambridge University Press, Vol I page 227, Vol II page 119

LABORATORY OF DR D JAYNE AND SON INC,
AND THE JOHN HARRISON LABORATORY OF CHEMISTRY
UNIVERSITY OF PENNSYLVANIA PHILADELPHIA

PHYSICAL PROPERTIES OF NEOARSPHENAMINE POWDER *

BY A E JURIST, J R VAN WINKLE AND W G CHRISTIANSEN

Very little has been written concerning the physical characteristics of neo arsphenamine powder The United States Public Health Service specifications (1) for neoarsphenamine state that "Stability shall be determined by exposing the ampuled product to a temperature of 56° C for a period of at least 24 hours, during which time it should show no marked change in color, consistency, or solubility" This statement does not, however, describe the various changes which can occur during the "heat-testing" of neoarsphenamines The following discussion is based on a large number of observations made during the testing of a variety of neo arsphenamines all of which were sealed in evacuated ampuls

* Scientific Section A PH A, Madison meeting, 1934

Although neoarsphenamine is usually described as a yellow, free-flowing powder, there are several different types of powder

(*a*) A powder consisting of coarse sandy particles which show no tendency to cling together when an ampul of the product is rotated slowly

(*b*) A very finely divided, fluffy type of powder whose particles cling together

(*c*) A powder containing a mixture of both fluffy and coarse particles with noticeable differences in color existing between the particles of different size

(*d*) A powder which is finely divided and which consists of small sandy or hard particles, not of soft, fluffy ones

All of these different types of powders have been found in commercial samples of neoarsphenamine

It is apparent that the differences between the several types of powder are due to variations in the physical characteristics of the individual particles such as size, shape, and hardness or porosity, and need not have any relation to the chemical or biological properties of the product Since neoarsphenamine is a complex product which is produced by precipitation, it is not unexpected that the physical properties may be varied rather extensively without altering the chemical or biological properties The Public Health Service specification quoted above relates to changes in the color, consistency, and solubility of the powder It is agreed that if chemical decomposition does occur during the heat test one might expect to find changes in the color, consistency, and solubility of the powder However, if two powders which are chemically identical and chemically stable on heat test are different in physical properties, it would be possible for changes to occur in the particles which would be observed as color or consistency change and these two changes would not then be indicative of chemical sensitivity or instability Any such purely physical changes should not, however, be accompanied by differences between solutions of the original and of the same material after heat test We have been interested in the magnitude and character of the powder changes which are associated only with the physical characteristics of the powder and in the mechanism whereby these changes occur

We will first mention the nature of the changes which have been noted and which are believed to be only physical, the consistency changes will be considered first A free flowing powder may change to one whose particles show a distinct tendency to cling together Also a dry looking powder may, after heating, show a greatly increased tendency to adhere to the wall of the ampul in which it is packaged One further change sometimes noted is that a dry powder may develop a wet appearance after heating Usually the heat-tested ampul is removed from the oven, allowed to cool for a short time, and compared with an unheated ampul Very often, when some such comparison shows a difference, this difference will decrease greatly if the heat-tested ampul is allowed to stand at room temperature for 24 hrs before comparison with an unheated ampul, *i e*, the powder gradually reverts to its original physical condition If the consistency change taking place during heat test is only temporary, reversion will occur slowly in the sealed ampul, but by opening the ampul the powder can be returned to its original consistency almost instantly These phenomena are very pronounced if the ampul, immediately after removal from the oven, is rotated so that the powder rolls around in the warm ampuls The powder may stick to the walls and appear to be

wet, but if the ampul is now opened the wet, sticky powder changes rapidly to its original dry, free-flowing condition Reversions of this type are in themselves indicative of the fact that the consistency change was only physical, and this belief is supported by the clarity and color of a solution of the heat-tested powder

A suggested explanation of the above findings is based on the fact that neo arsphenamines contain a small amount of volatile matter which may be water or some solvent used in the precipitation When the highly evacuated ampul containing the powder is kept in the oven, these traces of liquid are volatilized and exist in the space above the powder [1] The behavior of this volatile matter when the ampul is removed from the oven affects the consistency of the powder Immediately after removal from the oven the glass ampul starts to cool and does so faster than the powder inside, therefore instead of passing back into the powder the vapor starts to condense on the ampul as well as on the powder particles If the condensation on the glass is extensive a thin film of liquid will coat the ampul wall and if the ampul is rotated the particles become wetted by the liquid film and become wet and sticky in appearance If on the other hand the ampul is removed from the oven very carefully so as not to agitate the powder and if the ampul is allowed to stand at room temperature, the liquid film which initially deposits on the glass starts to pass back into the powder, neoarsphenamine is very hygroscopic and therefore as the film of liquid gradually evaporates from the glass it is reabsorbed by the powder We suggest therefore that in the absence of chemical decomposition, the consistency change in neoarsphenamine powder as a result of heat test is a function of the traces of volatile matter in neoarsphenamine and the manner in which it is reabsorbed by the powder

Color change of powder is sometimes difficult to evaluate correctly because changes in the character of the particles which are observed as consistency changes can produce apparent color changes Thus, it is known that two surfaces may have exactly the same shade of color but they will appear to be different if one is smooth and the other rough Therefore if the powder changes in consistency, an apparent color change of powder is not unexpected Also, if the vapor which is being reabsorbed by the heat-tested powder is all or partly water, a surface darkening of the particles would be expected because when these traces of water come in contact with the particles there would be an infinitesimal but still detectable "gumming" of particles on the surface In so far as these color changes are associated with consistency changes, they should lessen when the ampul is handled, after heat test, in such a way that the consistency change disappears Such is the case, however, there are also color changes of powder which do not disappear during the consistency reversion, but which nevertheless are not related to chemical change A powder may have darkened permanently after heat test, but when its solution is compared with that made by dissolving an ampul which has not been heated, the two solutions may be identical in color We conclude, therefore, that both the temporary color change which may be observed in conjunction with the consistency change and the more permanent one are related to the physical properties of the powder

[1] If one is interested in observing the liquid which volatilized during the heat testing the ampuls may be placed in a verticle position with the tip upward in the heat test oven using a temperature slightly above 56° C At the conclusion of the test liquid will be observed in the tip of the ampul

The variable extent to which these consistency and color changes occur and the extent and rate of reversion are due or at least intimately related to the original character of the individual particles of which the powder is composed

We wish to re-emphasize the fact that all discussion in this paper relates only to changes in powders which do not undergo chemical changes during heat test and the object has been to direct attention to and explain certain minor changes observable in tests used to control neoarsphenamine

BIBLIOGRAPHY

(1) Treasury Dept, U S Public Health Service, Miscel Pub No 22

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES,
E R SQUIBB AND SONS BROOKLYN N Y

DRUG EXTRACTION I A STUDY OF VARIOUS MENSTRUA FROM THE STANDPOINT OF SWELLING EFFECTS, PENETRATION AND EXTRACTION

BY WILLIAM J HUSA AND LOUIS MAGID

(*Continued from page 984, October Journal*)

PENETRATION OF VARIOUS SOLVENTS

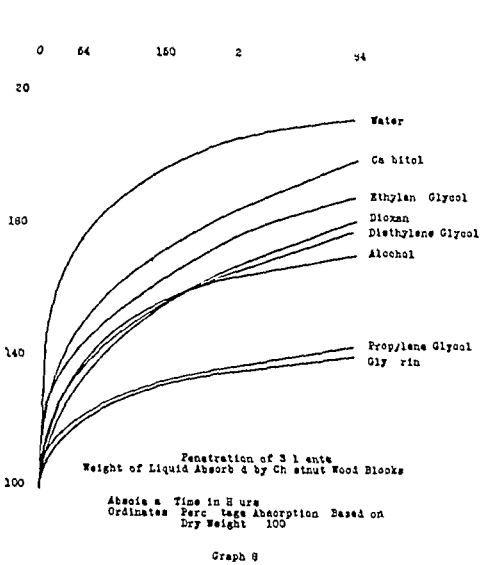
The penetration of liquids through cells is one of the fundamental factors to be considered in drug extraction Since botanists have been more interested in living tissues, very little has previously been done on the permeability of dried tissues, such as drugs

Penetration of Various Solvents into Chestnut Wood—In connection with the tests of swelling on blocks of chestnut wood (see Table X) the rates of penetration of the solvents were determined by weighing the blocks at various intervals, the increase in weight indicating the amount of solvent which entered the block There is a loss of soluble constituents from the blocks, but this does not introduce a serious error in the case of chestnut wood For weighing, the blocks were removed from the liquid and the excess liquid on the surface removed by blotting with filter paper The results are stated on a percentage basis, taking the original weight of the blocks as 100 Each result represents the average of three blocks

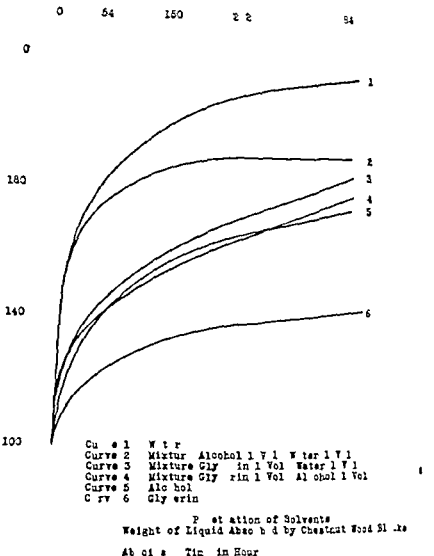
The results in Table XVIII show the rate of penetration and the weight of liquid imbibed in 384 hours by blocks of chestnut wood The rate of penetration is indicated by the slope of the curves (see graphs) and the time of attainment of equilibrium and from Table XIX Water shows the most rapid rate of penetration, and a greater weight of water is absorbed Alcohol also penetrates rapidly, but the weight imbibed is less than the weight of carbitol, ethylene glycol, dioxan and diethylene glycol Propylene glycol and glycerin show the lowest rate of penetration and are imbibed to a much smaller extent than the other liquids (see Graph S)

Of the binary mixtures of water, alcohol and glycerin, it is seen that a mixture of equal volumes of alcohol and water shows as fast a rate of penetration as does

water but is imbibed to a lesser extent, mixtures of equal volumes of glycerin and water and glycerin and alcohol show about the same rate of penetration as does alcohol (see Graph 9)



Graph 9



G ph 9

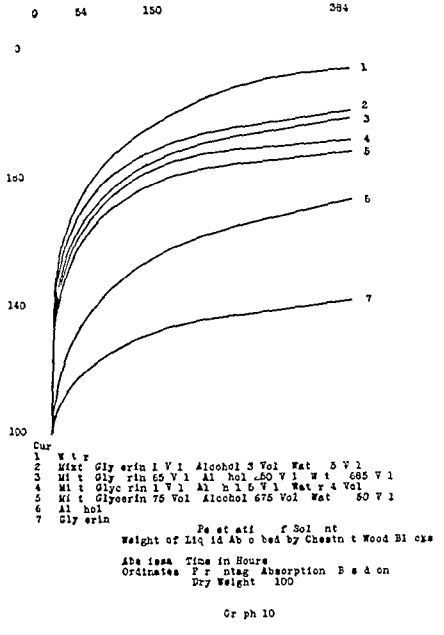
TABLE XVIII —PENETRATION OF LIQUIDS INTO CHESTNUT WOOD

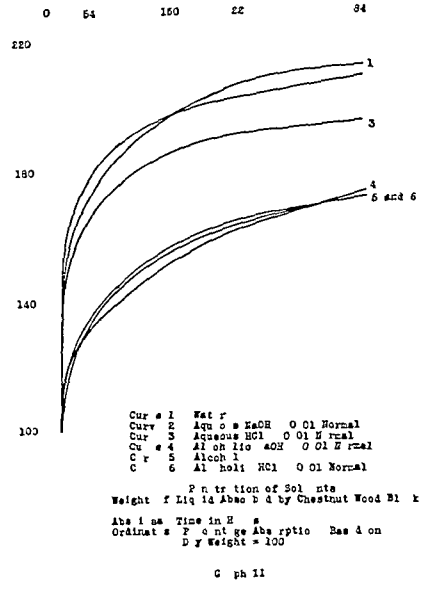
Abbreviations alc = alcohol alcoholic abs = absolute, aq = aqueous, gly = glycerin, mixt = mixture, v = volume

Liquid	Dry 0	After Time Intervals (Hours) 6	12	24	54	83	150	222	384
Water	100	143	153	166	175	186	195	207	212
Alcohol	100	115	119	128	139	145	157	164	172
Glycerin	100	107	107	116	121	121	132	137	141
Dioxan	100	115	119	124	134	142	157	168	182
Carbitol	100	116	126	138	151	158	172	183	200
Diethylene glycol	100	113	117	126	140	144	156	166	179
Propylene glycol	100	115	115	117	122	126	134	137	144
Ethylene glycol	100	126	128	134	143	150	163	178	189
0 01*N* aq HCl	100	141	148	162	172	176	185	192	195
0 01*N* aq NaOH	100	150	159	171	183	188	195	203	209
0 1*N* alc HCl	100	117	121	129	139	146	158	163	172
0 01*N* alc NaOH	100	119	121	127	137	141	152	163	173
Mixt alc 1 v —water 1 v	100	143	153	164	174	177	183	188	188
Mixt gly 1 v —water 1 v	100	121	126	135	142	149	159	169	182
Mixt gly 1 v —alc 1 v	100	123	126	129	139	144	152	163	176
Mixt gly 1 v —alc 5 v —water 4 v	100	135	143	153	166	174	182	188	190
Mixt gly 1 v —alc 3 v —water 5 v	100	140	146	160	174	180	188	194	199
Mixt gly 75 v —alc 675 v —water 250 v	100	134	140	151	166	171	178	183	187
Mixt gly 65 v —alc 250 v —water 658 v	100	138	146	157	172	177	186	191	197

The ternary mixtures of water, alcohol and glycerin penetrate as rapidly as water, while the amount of liquid imbibed is less than that of water and more than that of alcohol (see Graph 10)

The results show that the weight of 0 01*N* aqueous HCl is slightly less than for water while a corresponding quantity of NaOH has practically no effect, with the exception of showing a slightly increased rate of penetration during the first period of imbibition In alcohol, the absorption is practically unchanged on addition of acid and alkali (see Graph 11)





At the end of the experiments, the blocks were cut open and observations made visually as to the indications of completeness of penetration It was found that glycerin, a mixture of equal volumes of glycerin and alcohol, and propylene glycol were the only liquids which had not completely penetrated the blocks in 384 hours, which was the duration of the experiment It was found that with glycerin penetration across the grain was only barely perceptible and penetration with the grain was about 1 mm With propylene glycol penetration across the grain was only barely perceptible and penetration with the grain was about 2 mm It is interesting to note that in spite of the small distance apparently penetrated by the glycerin and propylene glycol, the imbibition was found to amount to 41 Gm of glycerin and 44 Gm of propylene glycol per 100 Gm of wood

In order to check more closely the rate of penetration of the various liquids into chestnut wood, blocks were placed in the various liquids and cut open at frequent intervals In some cases the line of demarcation between the dry and wet portions of the block was rather indefinite, hence penetration experiments were tried coloring the solvents with safranin and methylene blue, respectively However, it was observed that the dyes penetrated considerably slower than the liquid itself, due most likely to adsorption of the dyes by the wood It was therefore

concluded that the dyes were inapplicable for this purpose and experiments were made using pure solvents

Blocks of chestnut wood, averaging 1 75 mm in thickness and 24 mm square, were placed in various liquids, and one block from each liquid cut open at various time intervals In one experiment, blocks with the grain running the long way were used, and in another, blocks with the grain running the short way were used The liquids, with the time required for complete penetration, are given in Table XIX

TABLE XIX —RATE OF PENETRATION OF VARIOUS LIQUIDS INTO CHESTNUT WOOD BLOCKS

Liquid	Time for Complete Penetration in Blocks with Grain Running the Long Way	Blocks with Grain Running the Short Way
Water	1 day	2 0 hours
Alcohol	2 days (?)	2 5 hours
Dioxan	6 days	6 0 hours
Carbitol	11 days	11 0 hours
Ethylene glycol	14 days	40 0 hours
Diethylene glycol	29 days	70 0 hours
Propylene glycol	Incomplete after 35 days Penetration about 3 mm with grain and about 0 5 mm across grain	125 0 hours
Glycerin	Incomplete after 35 days Penetration about 1 5 mm with grain and not perceptible across grain	Incomplete after 314 hours

The results in Table XIX show the comparative rates of penetration of the solvents studied The results prove definitely that liquids penetrate faster with the grain than across the grain, since the penetration was so much more rapid in the blocks which had the grain running the short way

Penetration of Various Solvents into Other Woods —In connection with the tests of swelling on blocks of oak sapwood (see Tables XII–XV) additional measurements were made to compare the absorption of liquids by oak wood, in three conditions, namely, (*a*) fresh, (*b*) dried to constant weight at room temperature, and (*c*) dried to constant weight at 90° C in an oven The rates of penetration were determined by weighing in the same manner as in the case of chestnut wood blocks (see "Penetration of Various Solvents into Chestnut Wood")

TABLE XX —LOSS IN WEIGHT OF BLOCKS OF FRESH OAK SAPWOOD ON DRYING

	Fresh	After Time Intervals (Hours)							
	0	3	10	24	46	240	528	720	1536
At room temperature	100	97	92	82	70	62	61	61	61
At 90° C in oven	100	75	68	56	55	55	55	55	55

It is seen that at room temperature the blocks lost 39 per cent of their weight, the constant value being obtained after 528 hours At 90° C in an oven, 45 per cent of weight was lost, the constant value being obtained after 46 hours

The blocks of fresh sapwood of oak absorb 12 per cent additional water With alcohol, it seems that at first some moisture is removed from the wood by the alcohol as the blocks decrease 4 per cent in weight, later the penetration of alcohol overcomes this effect and after 1536 hours the weight of the blocks is the same as the weight of the original fresh blocks The large amount of moisture in the oak sap

TABLE XXI —ABSORPTION OF LIQUIDS BY OAK SAPWOOD BLOCKS
(Weight of blocks stated on basis weight before drying = 100)

		After Time Intervals (Hours)								
		0	3	10	24	72	240	528	720	1536
Fresh blocks (undried)	Water	100	104	105	107	110	111	111	111	112
	Alcohol	100	98	97	96	98	98	99	99	100
	Glycerin	100	105	107	111	113	113	115	116	117
Blocks dried at room temperature	Water	61	91	96	99	103	106	107	108	
	Alcohol	61	85	90	92	95	96	97	97	
	Glycerin	61	66	70	73	79	85	90	94	
Blocks dried in oven at 90° C	Water	55	75	87	94	100	103	104	105	
	Alcohol	55	75	82	86	89	91	92	92	
	Glycerin	55	58	59	60	62	65	68	71	

wood apparently allows the entrance of glycerin, as it is seen that the blocks absorb 17 per cent of their weight of glycerin in 1536 hours

The results show that the imbibition of water and alcohol is somewhat less and of glycerin very markedly less with the blocks dried at room temperature than in the case of the undried and fresh blocks of oak sapwood Imbibition of water and alcohol is somewhat less and of glycerin very markedly less with the blocks dried in an oven at 90° C than in the case of the blocks dried at room temperature

Results similar to those obtained with oak sapwood have been obtained on the wood of an Elberta peach tree and the sapwood of Sassafras variifolium (Salisbury) O Kuntz (Lauraceæ)

Penetration of Various Solvents into Powdered Belladonna Root —Studies of the imbibition of solvents by powdered drugs is obviously of importance, since this is the form in which drugs are extracted There are no data available on the rate or amount of liquid imbibed by powdered drugs

When obtaining the data on the swelling of powdered belladonna root by the centrifuge method (see Tables XVI and XVII) determinations were also made of the number of cc of each liquid imbibed by the powdered drug These data were obtained by reading off the volume of unabsorbed, supernatant liquid in the graduated centrifuge tubes after centrifuging, and subtracting this volume from the known amount of added liquid, which was 8 cc In the following tables the results are expressed in terms of the volume of solvent in cc imbibed by 1 Gm of powdered drug and are based on the average of two determinations

With the binary mixtures of alcohol and water, it is seen that imbibition decreases as the alcoholic content of the mixture increases Since only a small proportion of liquid is imbibed after the first 20 minutes it would appear that the powdered drug is rather thoroughly penetrated within that time The difference in imbibition between 10 and 20 minutes is greater for the liquids consisting largely of alcohol, thus suggesting that for this particular drug penetration by aqueous liquids is more rapid than by alcoholic liquids Imbibition of glycerin-water mixtures is greater, in the time of the experiment, than of glycerin-alcohol and glycerin-alcohol-water mixtures

The results in Table XXIII indicate that with increasing fineness of powder, imbibition decreases until No 80 powder is reached where there is an increase in imbibition It is possible that the larger particles have a greater proportion of un-

TABLE XXII —IMBIBITION OF VARIOUS MENSTRUA BY BELLADONNA ROOT IN No 40 POWDER.
(Cc of solvent imbibed by 1 Gm of powdered drug)

Menstrua Volume of Alcohol	Water	Glycerin	Dry 0	Time of Maceration in Minutes 10	20	40	60	120	360	720	1440
0	1	0	0 0	2 6	2 7	2 6	2 9	2 9	3 0	3 2	2 8
1	7	0	0 0	2 6	2 7	2 9	3 0	2 6	2 8	3 0	2 8
1	3	0	0 0	2 3	2 2	2 4	2 4	2 6	2 5	2 6	2 5
1	1	0	0 0	1 8	2 2	2 1	2 2	2 2	2 1	2 0	2 2
7	3	0	0 0	1 8	2 4	2 2	2 1	2 0	2 0	2 0	2 2
5	1	0	0 0	1 5	2 2	2 2	2 0	1 8	1 9	2 0	2 0
9	1	0	0 0	1 5	2 0	2 0	2 2	2 0	2 0	1 9	1 8
1	0	0	0 0	1 4	2 0	1 9	1 9	1 8	1 8	1 8	1 9
0	3	1	0 0	2 6	2 5	2 6	2 6	2 5	2 5	2 5	2 7
0	1	1	0 0	2 5	2 6	2 5	2 6	2 6	2 6	2 5	2 7
0	1	4	0 0	2 4	2 5	2 5	2 5	2 4	2 7	2 7	2 7
3	0	1	0 0	2 0	2 0	2 2	1 8	1 8	2 0	1 9	2 3
1	0	1	0 0	2 3	1 9	1 9	2 3	2 1	2 3	2 1	2 4
1	0	4	0 0	1 7	1 6	1 6	2 3	2 1	2 2	2 4	2 4
250	685	65	0 0	2 0	2 0	2 4	2 2	2 2	2 3	2 5	2 4
500	400	100	0 0	1 8	1 8	1 9	1 9	1 8	2 1	2 0	2 2
675	250	75	0 0	1 8	1 9	1 9	2 0	2 0	2 1	2 0	2 0

damaged cells, and are thus able to hold more solvent in the cell cavities An opposing tendency, however, arises in the fact that swelling takes place largely near the surface in this type of material, so that small particles show a greater percentage swelling on the basis of this factor taken by itself It would seem from the results that when the No 80 powder is reached the increased total surface of the particles allows an increase in imbibition which overbalances the decreased amount of solvent held in cell cavities

TABLE XXIII —IMBIBITION OF MIXTURE OF ALCOHOL 5 VOL —WATER 1 VOL BY BELLADONNA ROOT OF DIFFERENT DEGREES OF FINENESS
(Cc of solvent imbibed by 1 Gm of powdered drug)

Powder No	Dry 0	Time of Maceration in Minutes 10	20	40	60	120	360	720	1440
20	0 0	2 2	2 2	2 3	2 1	2 3	2 4	2 7	2 4
40	0 0	1 6	2 0	1 9	1 9	1 8	2 0	1 9	2 2
60	0 0	1 6	1 6	1 4	1 6	1 8	1 6	1 6	1 8
80	0 0	1 6	1 6	1 8	1 8	2 0	1 8	1 9	1 8

Discussion of Results on the Penetration of Various Solvents into Woody Tissues —The following table lists the solvents used in the penetration study in the order of decreasing rate of penetration into chestnut wood Along with this are the molecular weights and the amounts of the solvents absorbed by chestnut wood in 384 hours, expressed in moles, grams and cubic centimeters of solvent

It would seem that smaller molecules should, other things being equal, penetrate in greater amount than larger molecules The results in Table XXIV show that for those liquids showing complete penetration in 384 hours the amount of liquid which penetrates is inversely proportional in a general way to the molecular weight when the amount absorbed is expressed in moles, when expressed in Gm or cc the rule does not hold *However, the rate of penetration is not* controlled entirely by the size of the molecule The slower penetration of larger molecules

would be in accord with a mechanical or sieve theory of penetration, although other factors would enter, such as association of liquids, surface tension, viscosity, vapor pressure, etc

TABLE XXIV

Solvent	Mol Wt	Absorbed by 100 Gm Wood Moles	Grams	Cc
Water	18	6 22	112	112
Alcohol	46	1 57	72	89
Dioxan	88	0 93	82	79
Carbitol	134	0 75	100	94
Ethylene glycol	62	1 44	89	80
Diethylene glycol	106	0 75	79	70
Propylene glycol*	76	0 58	44	42
Glycerin*	92	0 45	41	33

* Did not penetrate the blocks of chestnut wood completely in 384 hours

Water and alcohol-water mixture show a rapid rate of penetration with water penetrating in greater amount Glycerin-water mixture shows a slower rate of penetration than alcohol-water mixture, but a more rapid rate than glycerin-alcohol mixture

The four glycerin-alcohol-water mixtures used in the U S P and N F extractions all show similar rates of penetration and the amount penetrating lies between the amounts penetrated by alcohol and water alone The results indicate that the variation in the four official menstrua has practically no effect on penetration and imbibition

The weight of 0 01*N* aqueous HCl is slightly less than for water alone while a corresponding quantity of NaOH has practically no effect In alcohol the absorption is practically unchanged on addition of acid and alkali

Penetration of Various Solvents into Fresh and Dried Woods—The results obtained with fresh and dried wood offer interesting facts It has been shown that fresh wood takes up considerable water, and that dried wood not only regains the water lost on drying but takes up a further amount of water This fact may not have received consideration in connection with drug extraction but it has been known to plant physiologists that plant tissues show a water deficit, or unsaturated hydration capacity (4) This condition in the plant is due to the fact that water in the living plant is being used up in metabolic plant processes and is constantly being lost from the surfaces by transpiration, the water available must be divided up among all tissues and accordingly the unsatisfied hydration capacity of a tissue may vary widely according to conditions, for example, fresh oak sapwood absorbed 12 per cent of water, while fresh sassafras wood absorbed 35 per cent of water

(*To be continued*)

The melting point of quinine ethyl carbonate given in the British Pharmacopœia appears to be too high The melting point of the dried salt of pharmacopœial purity seems to lie between 90° and 92° C When the salt is purified by recrystallization the melting point may be raised to 91 5° to 92 5° C The melting point of the substance without previous drying is higher than that of the dried salt and the final point of melting may be above 95° C The presence of free quinine as an impurity lowers the melting point'—G R PAGE Laboratory British Pharmacopœia Commission

LABORATORY NOTES ON THE STABILIZATION OF FLUIDEXTRACT OF ERGOT *

BY ELMER H STUART AND FRANCIS E BIBBINS

In spite of the large number of published articles relating to the deterioration of Fluidextract of Ergot, the problem of a satisfactory method of stabilizing this preparation has not yet been solved Because of this fact the laboratory notes herein reviewed are submitted with the hope that they may be of value to other workers interested in this problem The authors wish to point out that many of the ideas are not original but have been gathered from the literature as sugges tions worthy of investigation

The various assay results reported in this paper were carried out according to one of three well-known methods of determining potency of ergot and its prepara tions These methods were, *first*, a modification of the Broom and Clark method (1), *second*, the Cock's Comb method of the U S P X and *third*, a modification of Smith's Colorimetric method (2)

Swanson in 1929 (3) pointed out that the control of the p_H of Fluidextract of Ergot is important Our data, however, would indicate that the problem is more complicated than that of adjusting the p_H, by the addition of acid to the Fluid extract

The various methods for determining p_H were investigated for a reliable method applicable to Fluidextract of Ergot and one which could be readily checked by laboratory chemists The hydrogen electrode was discarded because the results are questionable in the presence of alcohol The removal of the alcohol before de termining the p_H so altered the Fluidextract that the figures obtained were of little value The quinhydrone electrode [Coons (6)] gives p_H values which are readily duplicated when the following method is observed

Add 0 1 Gm quinhydrone (Eastman) to 5-cc Fluidextract of Ergot Adjust the tempera ture to 25° C and read after allowing two or more minutes for the electrode to reach equilibrium Before using the electrode it should be cleaned as Coons suggests by boiling for five minutes in 50% nitric acid solution, rinsing with distilled water followed by boiling for five minutes in 10% sodium bisulphite solution and again rinsing with distilled water

It has been the observation of the authors that some Fluidextracts of Ergot appear to be relatively stable while others made by the same method from another lot of ergot deteriorate rapidly It is our opinion that some lots of crude ergot contain something that stabilizes the Fluidextract while other lots do not contain sufficient of this material to exercise the stabilizing influence for any appreciable time In an attempt to answer this question the ash was determined from a num ber of Fluidextracts of Ergot in order to see if this factor had any relation to sta bility The ash varied from 1 33 Gm to 2 09 Gm per 100 cc , but showed no rela tion to stability The iron in the ash was next determined and was found to range from a trace up to 0 25 Gm per 100 cc calculated to ferric oxide Again there was no relation to stability Fluidextract of Ergot also contains traces of copper, alu minum and nickel As a further check on the influence of metals, the percolation was carried out in glass, iron and monel percolators (see Table I) The results were negative

* Scientific Section A PH A Washington meeting, 1934

Since some Fluidextracts of Ergot are more stable than others, it occurred to the authors that perhaps this condition might be due to variation in the proportion of rye grains contained in different lots of ergot This was checked by adding to the Fluidextract an extract of rye prepared in the same manner as the Fluidextract of Ergot The result obtained was negative (see Table II)

TABLE I —FLUIDEXTRACT OF ERGOT

Drug No		Sample No	Additions per 500 Cc	p_H	p_H after Aging 6 Mos	Assay Broom and Clark 1 Mo	4 Mos	8 Mos	1 Yr	U S P X 1 Mo	3 Mos	8 Mos
A		P 22596		4 5	4 75		140	90	55		120	25
	Glass percolator	P 22596 B	7 5 cc 36% HCl	3 1				100				
		P 22596 D	15 0	2 2			160				115	
		P 22596 F	8 2	3 0	3 3	330	125	100	108	120	100	50
	Monel percolator	P 22597		4 6			125					
		P 22597 B	7 5 cc 36% HCl	3 1			150	100	97	300–320	300–320	25
		P 22597 C	8 25	3 0				100				100
		P 22597 D	10 0	2 9		160						
		P 22597 E	15 0	2 35			150				120	
B		P 22733		4 7			40		30		25	
	Glass percolator	P 22733 C	8 25 cc 36% HCl	3 1				15				15
		P 22733 D	10 0	2 9		100	50	20	30	100	50	20
											4 Mos	
		P 22733 F	20 0	2 15			25				33	

TABLE II —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Additions per 500 Cc	p_H	p_H after Aging	Assay Broom and Clark 1 Mo	4 Mos	8 Mos	1 Yr	U S P X 1 Mo	4 Mos	8 Mos
C	P22792		4 6	4 8		120	75			200	50
	P22792 C	8 25 cc 36% HCl	3 0	3 35	125	200	100	105	130	120	100
	P22792 E	15 0	2 2	2 7		100		80		50	
	P22792 F	20 0	1 65				100				100
D	P23803		3 7		100	100			100		
	P23804	3 6 cc 36% HCl	3 0		100–110	100–110			120	Colorimetric 8 Mos	
	P23814	3 6 cc 36% HCl 1% milk sugar	3 0			30	35	25	8 Mos 40	15	
	P23815	3 6 cc 36% HCl 1% cane sugar	3 0			66⅔	51	25	40	35	
	P23816	3 6 cc 36% HCl 2 5% dextrose	3 0			100	100	62	80	65	
	P24151	3 6 cc 36% HCl 2 5% rye extract	3 0					65			
	P24152	3 6 cc 36% HCl 10 Gm Hydroqui none	3 0					94			

The addition of cane sugar, milk sugar and dextrose to Fluidextract of Ergot resulted in increased deterioration (see Tables II and III) As an additional check on this point, two relatively stable and two unstable Fluidextracts of Ergot were tested for their reducing action of Fehling's solution (U S P X, page 497) as follows

Five-cc Fluidextract of Ergot were evaporated so as to remove the alcohol then 15 cc each of Fehling s solution A and B added The mixture was diluted to 100 cc then boiled for two minutes and filtered through a tared Gooch crucible The precipitate was washed with distilled water followed by alcohol and by ether and then dried thirty minutes at 100° C The blank was run in the same way omitting Fehling's solution A (copper sulphate solution)

Sample No 1 (Stable) 1 cc reduced 0 0214 Gm CuO
Sample No 2 (Unstable) 1 cc reduced 0 0116 Gm CuO
Sample No 3 (Stable) 1 cc reduced 0 0157 Gm CuO
Sample No 4 (Unstable) 1 cc reduced 0 0228 Gm CuO

TABLE III —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Method of Percolation U S P X Type A Fluidextract	Additions per 500 Cc	p_H	Assays Broom and Clark 1 Mo	Broom and Clark 2 Mos	Colorimetric 1 Mo	Colorimetric 2 Mos
E	P24460	50% alcohol	6 cc 36% HCl	3 0	110		100	
	P24461	50% alcohol plus 9 1 cc 36% HCl per 500 Gm		4 2	100		110	
	P24462	66⅔% alcohol	3 5 cc 36% HCl	3 0	108		100	
	P24463	66⅔% alcohol plus 9 1 cc 36% HCl per 500 Gm		4 2	133		120	
	P24464	75% alcohol	2 5 cc 36% HCl	3 0	106	110	110	
	P24465	75% alcohol plus 9 1 cc 36% HCl per 500 Gm		4 2	140		150	
	P24466	85% alcohol	3 0 cc 36% HCl	3 0	130	90	140	
	P24467	85% alcohol plus 9 1 cc 36% HCl per 500 Gm		4 2	150		160	
	P24523	90% alcohol plus 9 1 cc 36% HCl per 500 Gm		4 4	177		120	
F	P24514	50% alcohol plus 9 1 cc		4 6		167		130
	P24515	36% HCl per 500 Gm	2 5% dextrose			109		95
	P24516		2 5% sodium thiosulphate			80		100
	P24517	85% alcohol plus 9 1 cc		4 8		200	200	20
	P24518	36% HCl per 500 Gm	2 5% dextrose			18		20
	P24519		2 5% sodium thiosulphate			30		20
	P24520	95% alcohol plus 9 1 cc			135	115	140	100
	P24521	36% HCl per 500 Gm	2 5% dextrose			62		80
	P24522		2 5% sodium thiosulphate			116		93

TABLE IV —FLUIDEXTRACT OF ERGOT, U S P X

p_H Previously Adjusted to 3 0 with HCl

Lot Fluid extract of Ergot	Sample No	Additions	Assays Broom and Clark after Aging 1 Mo	4 Mos	5 Mos	U S P X 1 Mo	Colorimetric 1 Mo
1	P24269		100	90	84	97	100
	P24270	Aerated 48 hours	100			114	116
	P24271	0 5% petroleum benzin then aerated 48 hours	100	38			96
							4 Mos
	P24272	¼ full bottle		38			45
							1 Mo
2	P24274		120	120	123		120
	P24275	Aerated 48 hours	90				110
	P24276	0 5% petroleum benzin then aerated 48 hours	100			120	100
	P24277	¼ full bottle		58			60
				2 Mos			
1	P24716			120			
	P24718	0 65% borneol		72 5			
	P24719	0 65% benzaldehyde		40			
	P24720	10% acetone		44			
	P24721	0 65% hydroxy methyl anethol		74			
	P24722	0 65% NaH_2PO_4		54			
	P24756	0 1% quinaldine		71			

Various substances that might function as antioxidants and inhibitors were added to the Fluidextract of Ergot, namely, hypophosphorous acid, linseed oil, vitamin A concentrate, hydroquinone, carotene, sodium thiosulphate, sodium hydrosulphite, ferrous sulphate, ergosterol, cholestrin, borneol, benzaldehyde, acetone quinaldine and hydroxy methyl anethol Of the foregoing compounds only the first four appeared to show any stabilizing influence on Fluidextract of Ergot (see Tables II, III, IV and V)

TABLE V —FLUIDEXTRACT OF ERGOT U S P X

p_H Previously Adjusted to 3 0 with HCl

Lot Fluidextract of Ergot	Sample No	Additions	Assay Broom and Clark after 3 Wks at 50° C
3	P26417	0 025% carotene	73
	P26418	0 025% vitamin A concentrate	89
	P26419		73
	P26625	0 5% ergosterol from ergot	55
	P26626		51
	P26627	0 5% cholestrin	46
	P26628	0 5% vitamin A concentrate	95
4	P26634	0 5% ergosterol from ergot	63
	P26635	0 5% cholestrin	55
	P26636	0 5% vitamin A concentrate	50
	P26637		41
5	P26910	0 5% vitamin A concentrate	40
	P26911	0 5% cod liver oil	45
	P26912	0 5% alcoholic extract cod liver oil	49
	P26913		25
	P27028	0 5% cod liver oil	45
	P27029	0 5% linseed oil	60
	P27030	0 5% liquid petrolatum	50
	P27031	0 5% cottonseed oil	49
	P27032	0 5% ergot oil (petroleum benzin)	38
	P27033		38
6	P27022	0 5% cod liver oil	50
	P27023	0 5% linseed oil	60
	P27024	0 5% liquid petrolatum	40
	P27025	0 5% cottonseed oil	47
	P27026	0 5% ergot oil	44
	P27027		50

The method of the British Pharmacopœia, 1932, requires extraction of the ergot with fifty per cent alcohol containing one per cent of tartaric acid The Fluidextract of Ergot made by this method (see Table VI) deteriorated within six months This is about the same rate of deterioration as is observed when the U S P X method of preparation is used The addition of tartaric or of hydrochloric acids to the Fluidextract did not give a stable product as is shown by Tables VI, VII and VIII

In Tables III, VI and IX the method of percolation was changed from the fractional percolation procedure of the U S P X to the single percolation process which is described on page 159 of the Pharmacopœia as process Type A This method of percolation yielded a Fluidextract of Ergot which is as active as the regular U S P X method when made from the same lot of drug (compare Table VI)

Wokes and Elphick (4) found that defatting ergot increased the efficiency of the extraction with either neutral or acidified alcohol Our results as shown in Table IX do not support this statement As a matter of fact we have prepared a standard Fluidextract of Ergot by percolating the whole drug without having applied any preliminary treatment Our attempt to answer the question as to whether the stability of the Fluidextract is influenced by the incomplete removal of the petroleum benzin from the drug before percolation is shown in Table IV The addition of petroleum benzin to the Fluidextract apparently had no effect on the stability

TABLE VI —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Method of Percolation	Additions per 500 Cc	p_H	Assays Broom and Clark 1 Mo	4 Mos	6 Mos	1 Yr	U S P X 3 Mos	6 Mos.
B	P22875 A	The 1932 British Pharmacopœia	3 7 Gm tartaric	4 0		50			25	
	P22875 C		11 1 Gm tartaric	3 1			50			80
	P22875 D	(1% tartaric in 50%	12 95 Gm	3 0	160	100	2o	2o	50	33
	P22876 B	alcohol)	9 0 cc 36% HCl	3 0			25	65	25	33
E	P23454	U S P X			50				33	
	P23454 D	Iron fillings mixed with ergot	20 Gm tartaric				70			
	P23453	U S P X		5 8	3o				33	
	P23453 B	U S P X	7 5 cc 50% H_3PO	3 0			90			
	P23452	U S P X		5 4	100			40	70	
	P23452 B	Iron sulphate dried	3 0 cc 36% HCl					70		
	P23452 D	powder mixed with ergot 4 Gm per 500 Gm	20 Gm tartaric				110			
	P23455 A	U S P X type A	20 Gm tartaric				100			
	P23455 B	Fluidextract 50% alcohol	5 0 Gm $Fe_2(SO_4)_3$				105			

TABLE VII —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Additions per 500 Cc	p_H	p_H after Aging	Assays Broom and Clark 1 Mo	4 Mos	9 Mos	2 Yrs	U S P X 2 Mos	5 Mos	9 Mos
B	P27732 B	2 5 cc 36% HCl	4 6			33⅓			100	50	2o
				6 Mos							
	P27732 D	7 5	3 0	3 2	40	33⅓	20	30	100	50	2o
	P27732 E	10 0	2 5				1o				
	P27732 F	12 5	1 9			18	12			25	
	P27732 M	5 55 Gm tartaric acid	4 4o			33⅓				30	
	P27732 N	7 40	4 3				20				25
	P27732 P	11 10	3 5				12				25
	P27732 Q	12 95	3 3			50				2o	
C	P22791 A	3 70 Gm tartaric	4 7			50				62	
	P22791 B	7 40	4 2				50				62
				8 Mos							63
	P22791 E	14 80	3 0	3 2o			50	118		120	100–170
	P22791 F	16 65	3 0	3 20		100	100	100			

In Table IV the effect of air upon Fluidextract of Ergot was observed by bubbling through the sample, for 48 hours, a current of air previously saturated with the menstruum by passing the air through diluted alcohol No immediate loss of activity was observed, although, on aging the samples, the deterioration progressed more rapidly

In 1930 Thompson (7) recommended that Fluidextract of Ergot be distributed in completely filled bottles in order to prevent undue exposure to air Our findings (see Table IV) agree with his conclusions, since deterioration progressed more rapidly when stored in bottles that were one-fourth full

Our results shown in Table III agree with Linnell and Randle (5) in that an acid alcohol menstruum is more efficient than alcohol alone The table also indicates that the higher percentage alcohol extracts the activity more completely than does alcohol of lower concentration All samples, however, deteriorated upon aging

TABLE VIII —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Additions per 500 Cc	p_H	p_H after Aging 9 Mos	Assays Broom and Clark 4 Mos	9 Mos	2 Yrs	2 Mos	U S P X. 4 Mos	9 Mos
A	P 22595 A		4 7		100	100		100	80	25
	P 22595 D	7 5 cc 36% HCl	2 95	3 0o	160	66	69	115–130	70	25
	P 22595 F	12 5 cc 36% HCl	2 2		110	100			40–50	25
	P 2259o I	6 0 cc 36% HCl	3 1		100	100				50
	P 22595 K	1 8o Gm tartaric acid	4 45		130	90			5 Mos	25
									25	
	P 22595 P	11 10 Gm tartaric acid	3 15			50				
	P 22595 Q	12 95 Gm tartaric acid	2 95		160				33	
C	P 22790		6 0							25
	P 22790 A	2 5 cc 36% HCl	4 7		120	100	66⅔		62 5	
	P 22790 D	7 5	3 0			100	66⅔	80	100	100–110
	P 22790 E	10 0	2 5				33⅓			50
	P 22790 F	12 5	2 0			50			50–70	

TABLE IX —FLUIDEXTRACT OF ERGOT

Drug No	Sample No	Method of Percolation	Additions per 500 Cc	p_H	Assays Broom and Clark 1 Mo	5 Mos	U S P X 1 Yr 4 Mos	1 Mo
E	P23500	U S P X type A Fluid		4 6			85	
	P23500 A	extract menstruum—50%	5 0 cc H_3PO_2	3 1	60	150	150	100
	P23500 B	alcohol plus 7 cc 50%	7 5 cc. H_3PO_2				155	
	P23500 C	H_3PO_2 per 500 Gm ergot	5 Gm $Fe(SO_4)_3$			120	200	
	P23500 D		20 Gm tartaric		90–100	150	112	100
	P23500 E		3 75 cc HCl 36%	3 0		140	135	100
F	P24613	U S P X except used whole ergot not defatted		4 3	185		Colorimetric 160	
	P24614	U S P X except ergot not defatted		4 65	180		120	
	P24615	U S P X except used whole ergot		4 45	130		160	
	P24616	U S P X		4 75	113		160	
	P24710	U S P X except used whole ergot not defatted		4 3	180		2 Mos 160	

CONCLUSIONS

1 Fluidextract of Ergot is not stabilized by adjusting the p_H by means of acids

2 A reliable method for determining the p_H of Fluidextract of Ergot is outlined

3 Some lots of crude ergot contain something which tends to stabilize the Fluidextract more than others

4 The addition of rye extract to the Fluidextract of Ergot apparently does not influence the stabilization

5 The addition of sugars increases the deterioration of Fluidextract of Ergot

6 The power of Fluidextract of Ergot to reduce Fehling's solution bears no relation to stability

7 Hypophosphorous acid linseed oil, vitamin A concentrate and hydroquinone favorably influence the stability of Fluidextract of Ergot

8 Fluidextract of Ergot made by the method of the British Pharmacopœia deteriorates the same as that made by the U S P X method

9 The type of percolation is not important

10 Defatting the drug before percolation is not important

11 The activity of ergot is extracted more completely by acid alcohol than by neutral alcohol

12 Higher percentage alcohol is more efficient for percolation of ergot than low percentage alcohol

The authors wish to acknowledge the assistance received from Edward E Swanson, C C Hargreaves, Asa N Stevens, W J Rice and Edward J Hughes for the biological and chemical assay reports in this paper

BIBLIOGRAPHY

(1) Edward E Swanson, Clarence E Powell, Asa N Stevens and E H Stuart The Standardization and Stabilization of Ergot Preparations," Jour A Ph A, 21 (March and April 1932), 229, 320

(2) Asa N Stevens, 'The Standardization of Ergot—A Modification of Smith's Quantitative Colorimetric Assay" *Ibid*, 22 (1933), 99

(3) E E Swanson 'The Standardization and Stabilization of Ergot Preparations," *Ibid* 18 (1929), 1127

(4) F Wokes and G K Elphick, 'The Preparation of Liquid Extract of Ergot," *Quart J Pharm Pharmacol*, 2 (1929), 539, 3 (1930), 59

(5) W H Linnell and D E Randle "The Extraction of Ergot," *Pharm J* 119 (1927), 423

(6) C C Coons, 'Continuous Measurement of *p*H with Quinhydrone Electrodes," *Ind Eng Chem, Analyt Edit* 3, No 4 (1932), 402

(7) Marvin F Thompson "The Pharmacology of Ergot With Special Reference to Biological Assay and Standardization" Jour A Ph A, 19 (1930), 705

The Lilly Control Laboratories Indianapolis, Indiana

THE TESTING OF ERGOT

BY HOWARD H CROSBIE

In the course of investigating the breakdown rate of liquid preparations of ergot, we have in this laboratory been using all three usual methods of testing, *i e*, the Broome-Clarke rabbit uterus method, the Allport-Cocking color reaction, and the Cock's Comb method, with a distressing want of correlation, driving one to the verge of despair We have experimented with a photographic modification of the Cock's Comb reaction that we think it worth drawing to the attention of other workers

The method is to photograph the bird, before injection, by means of an appropriate light filter and red sensitive plates so that blue registers as black and red registers as white The bird is then injected and after $1^1/_4$ hours is again photographed on the same plate, consequently the two photographs get the same development The resultant prints although not necessarily good pictures of birds do pick up differences that are not visible to the unaided eye

Before making an assay, one prepares two pairs of reference prints, one pair with a dose of some standard (in this case Ergotoxine ethanesulphonate solution $^1/_2$ mg per cc) of such size as to produce a minimum effect as in Fig 1 Another reference photograph is made of the same bird with a larger dose and more pronounced effect as in Fig 3 In assaying a sample marked "A" a first trial was made on the assumption that it was probably over-strength and a lesser dose of "A" was given than had been given to the same bird in Fig 1 with the result shown

in Fig 2 The dose in Fig 2 being seven-eights that of No 1 one can say that had the effect been the same, Sample A would be 114% of the standard, but the effect is more, therefore the strength of "A" is more than 114% of the standard

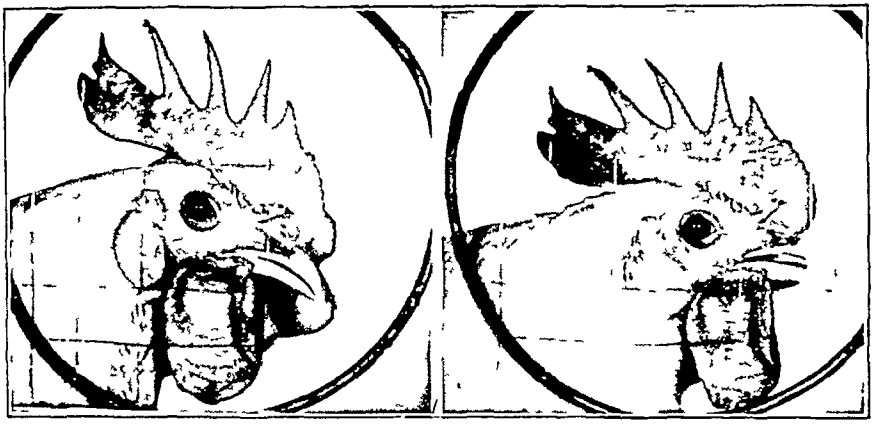


Fig 1 —*Reference print Minimum effect* (not visible to the eye) *Left*, Before injection Animal No 57 Sample No E E S Ampul *Right*, After injection of 1 75 cc —Sept 26, 1934

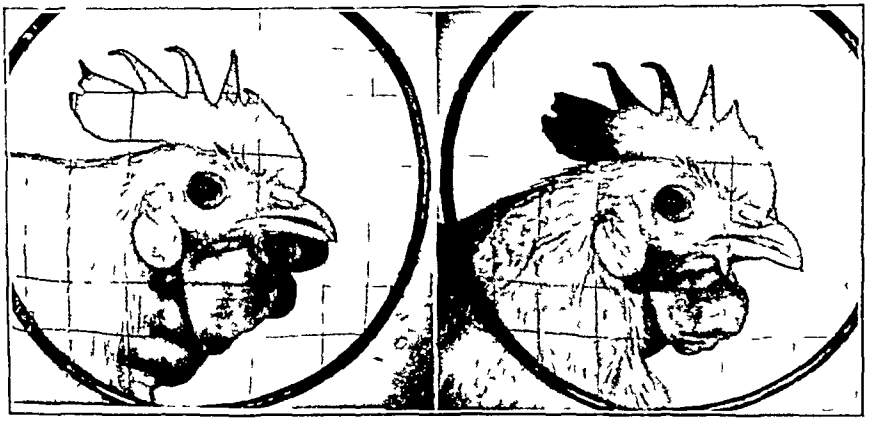


Fig 2 —*The unknown I eft*, Before injection Animal No 57 Sample No A—*Right*, After injection of 1 75 cc —Sept 26 1934

When we compare Figs 2 and 3 we find the ratio of dose 175/250 Had the effect been the same, "A" would be 143% of the standard, but the effect is less, therefore the strength of "A ' is less than 143% of the standard

By taking another bird and administering a dose representing 128% (mean of above limiting values), then comparing the print with the print of this bird's reaction to the standard, one can say whether strength is above or below 128% There seems to be no difficulty in getting results that can be relied on to an accuracy of within 10%

A bird whose temper has been ruffled also ruffles its feathers and may give the impression that the exposures are not the same Prints are best judged by holding at arm's length with partly closed eyes It is also necessary to concentrate

one's attention on the combs alone and to neglect the human hand which shows black, not being in the spotlight

Another question may arise, would another bird give the same result? We cannot trespass on the hospitality of the editor to reproduce the prints but we have photographic evidence that four other birds with this sample gave concordant results

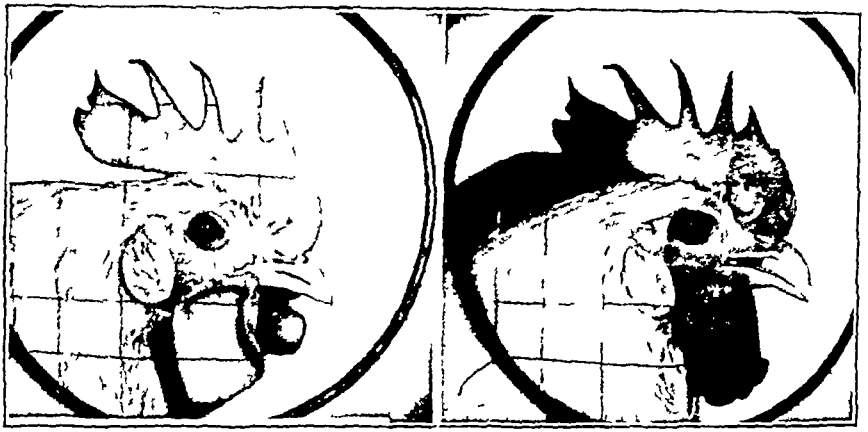


Fig 3 —*Reference print* *Full effect* (visible to the eye) *Left* Animal No 57, Sample No E E S ampul *Right* After injection of 2 5 cc —Sept 19 1934

The difficulties of the official method appear to be chiefly in the lack of power of the human eye to detect a small proportion of blue in the presence of strong red We have been using this photographic method in routine testing of manufactured batches for a considerable time and we are convinced that much more accurate results are obtained thereby, with the additional advantage of having an easily translatable permanent record

After taking more than 100 photographs we have come to the conclusion that reliable results can only be obtained by comparing the photograph of the effect of the unknown against the effect of a standard solution *on the same bird* We have yet to find one pair that contradicts another when compared in this way

The photographic technique is fairly simple, using an "A" filter and Wratten Panchromatic plates, an exposure of $^1/_{15}$ sec at f/4 5 is sufficient when using two photoflood lamps

The function of the ring screen showing in the prints is to avoid the necessity of arranging and refocusing each time, the ring and camera being fixed on a base board which also holds the two flood lights which have reflectors to concentrate the beams on the ring screen This arrangement ensures similar lighting conditions for both exposures

A repeating back is needed to obtain both images on the same plate and is of the usual type

A white background is desirable but pointing to the sky is not practical as blue sky registers as black We find a ground glass screen illuminated from behind gets over this difficulty

THE LABORATORIES OF THE WM S MERRELL COMPANY CINCINNATI, OHIO

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

PHARMACOPŒIAS AND FORMULARIES

Hampshire, C H
The British Pharmaceutical Codex, 1934 I—Pharmacy
Pharm J 133 (1934), 357
Sprague, T A
The British Pharmaceutical Codex, 1934 III—Pharmacognosy
Pharm J 133 (1934), 423

APPARATUS AND MANIPULATIONS

Husa, William J , and Magid, Louis
Drug extraction I A study of various menstrua from the standpoint of swelling effects, penetration and extraction
JOUR A PH A , 23 (1934), 980
White, John
Sterilization by filtration
Pharm J , 133 (1934), 355

PHARMACEUTICAL PREPARATIONS

Andrews, Marvin J
Determination of the reasonable or permissible margin of error in dispensing III Suppositories
JOUR A PH A , 23 (1934), 1003
Bachstez M , and Cavallini, G
Green coloration of solutions of quinine salts
Ann chim applicata, 23 (1933), 490, through *Chem Abstr* , 28 (1934) 2123
Baker, William B
Deterioration and stabilization of aconite preparations Part I
JOUR A PH A , 23 (1934), 974
Feist K
Taste corrective for potassium iodide mixtures
Apoth -Ztg , 79 (1934), 437
Fialkov, Y A , and Natanson, E M
Changes in protargol solutions on keeping
Khim Farm Prom (1933), 289–290, through *Chem & Ind* , 53 (1934), 907B
Hesse, E Altner, W , and Becker, J
A new, water-soluble digitalis preparation
Klin Wochschr 12 (1933), 1722, through *Chem Abstr* 28 (1934), 1467
Johnson, Harold A and Clark, Ralph W
An enteric coating for tablets
JOUR A PH A , 23 (1934), 1014
Kuhn A , and Schafer, G
Homeopathic preparations III
Pharm Ztg , 79 (1934), 1065
Machado, J E , and Sonol J
Formula and preparation of syrup of terpinol hydrate
Rev facultad cienc quim , 8 (1933), 7, through *Chem Abstr* , 28 (1934), 2466
Nobili, G
Preparations of cod liver oil with iron and with ferrous iodide
Boll chim farm 72 (1933), 161, through *Chem Abstr* , 28 (1934), 2123
Regnier, Jean and David, Robert
Conservation of cocaine after sterilisation (Cont)
Bull sci pharmacol , 41 (1934), 468
Rektorik, Zedner
Preparation of fluidextract of cinchona by fractional percolation
Bull sci pharmacol , 41 (1934), 449
Rothenkirchen, O
Emulsification of cod-liver oil
Pharm Ztg , 79 (1934), 804–806, through *Chem & Ind* , 53 (1934), 847B
Rothenkirchen, Otto
Preparation of eye ointments
Pharm Ztg , 79 (1934) 1016
Stellfeld, C
Carrel-Dakin solution The solution of sodium hypochlorite-formulas for correction of tables
Tribuna farm , 2 (1934), 59, through *Chem Abstr* , 28 (1934), 2464
Ward, Justus C , *et al*
Studies on strychnine III The effectiveness of sucrose, saccharin and dulcin in masking the bitterness of strychnine
JOUR A PH A , 23 (1934), 984

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Coulthard, C E
The effect of germicides at 80° C
Pharm J , 133 (1934), 447

Cremer, H
Biological investigation of plant juices
Apoth -Ztg, 49 (1934), 1277
DeBeer, Edwin J, *et al*
The relative anesthetic effects of some urea derivatives
J Pharmacol & Exper Therap, 52 (1934), 211, 216
Dille, James M
Studies on barbiturates IX. The effect of barbiturates on the embryo and on pregnancy
J Pharmacol & Exper Therap, 52 (1934), 129
Dyson, G Malcolm
Iron in chemistry and pharmacy Part I—Historical
Pharm J, 133 (1934), 356
Gluschke, A
The synthesis of new vermifuges and their pharmacological use Relationship between chemical constitution and pharmacologic action of compounds of the santonin group
Arch wiss prakt Tierheilkunde 65 (1932), 201, through *Chem Abstr*, 28 (1934), 2126
Johnson, Wingate M
A case of granulopenia following amidopyrine, with two recurrences
J A M A, 103 (1934), 1299
Koppanyi, Theodore, Dille, James M, and Krop, Stephen
Studies on barbiturates VIII Distribution of barbiturates in the brain
J Pharmacol & Exper Therap, 52 (1934), 121
Koppanyi, Theodore, Murphy, William S, and Krop, Stephen
Studies on barbiturates X Acute barbital poisoning in dehydration and diuresis
J Pharmacol & Exper Therap, 52 (1934), 223
Landsberg, J W, and Thompson, Marvin R
The guinea pig as a hematopoietic test animal
Jour A Ph A, 23 (1934), 964
Munch, James C, and Krantz, John C, Jr
Pharmacological and chemical studies of the digitalis group I Adonis, Apocynum and Convallaria
Jour A Ph A, 23 (1934), 988
Nelson, Erwin E
The diuretic effect of posterior pituitary extract in the anæsthetized animal
J Pharmacol & Exper Therap, 52 (1934), 184
Penau, H, and Simonnett, H
Biological determination of the anti-diuretic activity of extracts of the posterior lobe of the pituitary gland
J Pharm et Chim, 20 (1934) 304
Pilcher, J D
Atropine tolerance in infants and children The negative action of the serum of tolerant subjects
J Pharmacol & Exper Therap, 52 (1934), 196
Pilcher, J D
The comparative actions of atropine and its constituents, *l* - and *d* - hyoxcyamine, in infants and very young children
J Pharmacol & Exper Therap, 52 (1934), 206
Rozenfeld, A D, and Tutaev, H V
Chemical evaluation of extract of ergot
Farm Zhur, 4 (1933), 156, through *Chem Abstr*, 28 (1934), 573
Schubel, Konrad, and Gehlen, Walter
A new convenient method for the standardization of posterior pituitary extracts
Arch exptl Path Pharmakol, 173 (1933), 633, through *Chem Abstr*, 28 (1934), 1467
Silver, Solomon
A new danger in dinitrophenol therapy
J A M A, 103 (1934), 1058
Vaisman, G
Extract of ergot, its biological evaluation
Farm Zhur, 3 (1933), 109, through *Chem Abstr*, 28 (1934), 573

VEGETABLE AND ANIMAL DRUGS

Benedetti, Roberto A
A phytochemical study of Canchalagua Panamena
Jour A Ph A, 23 (1934), 1012
Chakravarti, S, Sitaraman, M L, and Venkatasubban A
Chemical investigation of Indian medicinal plants III Leaves of Erythrina indica
J Annamalai Univ, 2 (1933), 238, through *Chem Abstr*, 28 (1934), 1470
Gsturner, F
Condurango bark and its preparations
Apoth -Ztg, 49 (1934), 1309
Kustiak, A
Microsublimation of caffeine and theobromine drugs
Pharm Monatsh, 15 (1934), 212
Lalanne, Pierre, and Mathou Therese
Examination of an Aristolochia of Guadeloupe
Bull sci pharmacol, 41 (1934), 460
Lundsgaard Einar, and Schou, Svend Aage
Hormones and hormone preparations
Arch Pharm Chemi, 41 (1934), 603
Majumdar, D N and Guha, P C
Indian medicinal plants I Withania somnifera
J Indian Inst Sci 16A (1933), 29, through *Chem Abstr*, 28 (1934), 1470

Markuze, Z
Do the leaves of Symphytum contain vitamins?
Arch Chem i Farm, *Polish*, 1 (1934), 205
Strazewicz, W J
Comparative study of several species and varieties of valerian with respect to quantity and quality of the volatile oil
Arch Chem i Farm, *Polish*, 1 (1934), 108
Zornig, H
Pharmacognostical studies
Apoth-Ztg, 49 (1934), 1262

ALKALOIDS AND GLUCOSIDES

Anon
International standardization of methods for the determination of morphine in opium
Arch Chim i Farm, *Polish*, 1 (1934), 192
Becker, J, and Suszko, J
Action of perbenzoic acid on the alkaloids of cinchona
Arch Chem i Farm, *Polish*, 1 (1934), 199
Cruess, W V, and Alsberg, C L
The bitter glucoside of the olive
J Am Chem Soc, 56 (1934), 2115
Dialkov, Ya, and Babich, S
Determination of alkaloids
Khim Farm Prom (1933), 148 through *Chem Abstr*, 28 (1934), 574
Klyachkina B A
Analysis of opium
Khim Farm Prom (1933), 203, through *Chem Abstr*, 28 (1934), 575
Milos, Herold
Preparation and purification of ergot alkaloids
Chimie & industrie (June 1933), 1017, through *Chem Abstr*, 28 (1934), 257
Munch, James C, and Pratt, Harry J
Alkaloidal reagents V The aconite alkaloids
Jour A Ph A, 23 (1934), 968
Ruitikov, M G
Determination of nicotine
Khim Farm Prom (1933) 140, through *Chem Abstr*, 28 (1934), 574
Stoll Arthur
Squill and digitalis glucosides
Pharm Acta Helv, 9 (1934), 145
Suszko, J
Importance of steric factors in the biogenesis of alkaloids
Arch Chem i Farm, *Polish* 1 (1934), 212
Yavnel, Y, and Belenitzka, D S
Determination of alkaloids in medical preparations
Farm Zhur (1933), 269–272, through *Chem & Ind*, 53 (1934), 908B

OILS FATS AND WAXES

Canals E, and Flous E
Surface tension of oils
J Pharm et Chim, 20 (1934) 241
Coates, C E, and Vick, M M
Magnolia-seed oil
Oil & Soap 11 (1934), 174–175, through *Chem & Ind* 53 (1934), 983B
Coe, M R
Effect of light on rancidity of oils and fats
Siebel Tech Rev 9 No 2 (1934), 51–52, through *Chem & Ind*, 53 (1934) 894B
Freyer E
Relation of moisture content to increase of free fatty acid content of cottonseed in storage
Oil & Soap 11 (1934) 162–164, 176, cf *B* (1933), 876, 1017, through *Chem & Ind*, *53 (1934), 893B*
Payne, John H, *et al*
The preparation of Chaulmoogra derivatives I Substituted amines and amides
J Am Chem Soc, 56 (1934) 2126
Takei, I T
Composition of "soy" oil
J Soc Chem Ind Japan, 37 (1934), 356–357B, through *Chem & Ind* 53 (1934) 894B

ESSENTIAL OILS

Chiris, A
Oil of angelica root
Parfums de France, 12 (1934), 16, through *Chem Abstr*, 28 (1934), 3182
de Fayard, J
Oil of Bordeaux pine needles
Bull inst pin (1933) 215, through *Chem Abstr*, 28 (1934), 1139
Garnier, R and Sabetay (Mme) S
Methods of analysis of Bulgarian rose oil
Ann fals, 27 (1934), 264–273, cf *B* (1934) 219 through *Chem & Ind*, 53 (1934) 908B
Glichitch, L S, and Naves Y R
Essential oils of Ocimum canum Sirus and of O gratissimum L
Chimie & industrie (June 1933) 1029, through *Chem Abstr* 28 (1934), 575
Henricksen H C
Bay-oil investigations
Puerto Rico Agr Exper Sta Annual Rept, 1932 (1933), 20, through *Chem Abstr*, 28 (1934) 1469
Kelkar N C and Rao B S
Indian essential oils V Oil from the rhizomes of Curcuma longa L

J Indian Inst Sci, 17A (1933), 7, through *Chem Abstr*, 28 (1934), 3523

Kelkar, N C, and Rao, B Sanjiva

Oil of Turmeric

J Indian Inst Sci, 17A, Part II (1934), 7-31, through *Perf & Ess Oil Rec*, 25 (1934), 283

Rutovskii B N, Guseva, K, and Koroleva, L

Volatile oil of Juniperus polycarpus, Kock

Riechstoff Ind, 8 (1933) 161

Tanchio, S S, and West, A P

Colobot essential oil from Citrus hystrix dc var torosa

Philippine J Sci, 52 (1933), 263, through *Chem Abstr* 28 (1934), 2845

ALKALOIDS AND GLUCOSIDES

Buntzelman N G

Determination of santonin

Khim Farm Prom (1933), 130, through *Chem Abstr*, 28 (1934) 574

Csipke, Z

Rapid method for titrimetric determination and separation of aluminum and copper in drug preparations by means of 8-hydroxyquinoline

Magyar Gyóg Tars Ért 9 (1933), 437, through *Chem Abstr*, 28 (1934), 1812

Dozsa, A

The analysis of antipyrine and some of its derivatives

Magyar Gyóg Társ Ért 9 (1933), 476 through *Chem Abstr*, 28 (1934) 1813

Feigl, F, and Krumholz, P

Detection and estimation of copper in pharmaceutical preparations

Scientia Pharm, 5 (1934), 19, through *Chem Abstr*, 28 (1934), 2844

Graham, J Howard

An electrical method for checking physiological salt solution

Am J Pharm 106 (1934), 325

Jespersen I C, and Larsen, K Thoudah

Identification of the therapeutically active barbituric acid derivatives

Dansk Tids Farm 8 (1934), 232

Kotoszejska, Z

Chemical method for the determination of vitamin C

Arch Chem i Farm, Polish, 1 (1934), 244

Kuhl H, and Czyzewsky, B

Complex mercury-arsenic compounds and their detection

Pharm Zentralh, 75 (1934), 660

Mainsbrecq V

Ash content of compound Licorice Powder

J pharm Belg 16 (1934), 771

Melichar, M

The analysis of aromatic tincture of iron with arsenic

Časopis Československ Lekárnictva, 13 (1933), 321 through *Chem Abstr*, 28 (1934), 2466

Opienska Blouth, J

Determination of strophanthin in the seeds and tincture of strophanthus

Arch Chem i Farm, Polish, 1 (1934), 29

Popov, D

Analysis of tablets

Khim Farm Prom (1933) 164, through *Chem Abstr*, 28 (1934) 574

Raymond Hamet

Color reaction of certain phenylamines

Bull sci pharmacol, 41 (1934), 481

Raigorodskaja, R L, and Binowa, E S

Determination of iodides and bromides in mixtures

Pharm Zentralh, 75 (1934), 609

Schulek, E, and Gervay V

Determination of hexamethylene-tetramine in medicinal preparations

Z anal Chem, 92 (1933) 406, through *Chem Abstr* 28 (1934), 1469

Schulek, E, and Floderer I

Determination of mercury in pharmaceutical preparations

Magyar Gyog Társ Ért, 10 (1934), 147, through *Chem Abstr*, 28 (1934) 3177

Stamm, J, and Kullmen, K

Evaluation of kamala

Pharmacia, 13 (1933), 109-113, *Chem Zentr* 1 (1934) 91, through *Chem & Ind* 53 (1934), 907B

Underwood H W, Jr, and Gale, John C

The preparation of derivatives for the identification of alkyl chlorides

J Am Chem Soc, 56 (1934), 2117

Van Zijp, C

Microchemical use of potassium iodide and sodium iodide

Pharm Weekbl, 71 (1934), 1075

Van Zijp, C

The micro-copper-pyridine reaction of saccharin

Pharm Weekbl, 71 (1934), 1146

Wagenaar, M

Contribution to the microchemistry of atophan

Pharm Weekbl, 71 (1934), 1100

Wagenaar, G H

Identification of *o*-oxyquinoline sulphate

Pharm Weekbl, 71 (1934), 1122

Zwikker, J J L

Analytical-chemical study of pentamethylenetetrazol
Pharm Weekbl, 71 (1934), 1170

INORGANIC CHEMICALS

Dominkiewicz, M
The commercial synthesis of guaiacol and the possibility of its realization
Arch Chem i Farm, Polish, 1 (1934), 1
Dominkiewicz, M
Studies on the structure of kaolin II Stability of the nuclei in kaolin and its derivatives
Arch Chem i Farm, Polish, 1 (1934) 115
Dominkiewicz, M
Studies on the structure of kaolin III The Anhydrokaolinates of sodium
Arch Chem i Farm, Polish, 1 (1934), 142

ORGANIC CHEMICALS

Caldwell, B P, and Piontkowski, F A
The addition of iodine and thiocyanogen to unsaturated compounds
J Am Chem Soc 56 (1934), 2086
Dominkiewicz, M, and Kijewska M
Synthesis of isatin from the economic standpoint
Arch Chem i Farm, Polish, 1 (1934), 228

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING IV PILLS *

BY MARVIN J ANDREWS [1]

INTRODUCTION

This, the fourth paper of this series,[2] deals with pills

Pills which the pharmacist compounds in the filling of prescriptions are usually made by intimately mixing the ingredients called for in the dry state in a mortar, adding the required amount of liquid excipient and kneading to develope a plastic mass The mass, when of the proper plasticity, is removed from the mortar and rolled into a pill pipe The latter is cut into the desired number of parts which are then rolled into pill form by hand The selection of the excipient and the amount to be used is in most cases left to the judgment of the pharmacist

The possibilities for error, where operations of the foregoing nature are involved in the filling of prescriptions, are numerous, and to determine to what extent each is a contributing factor would be almost an endless task Since, however, some investigations to determine the variations in the weight of pills made by pharmacists have been reported, further studies along this line seemed to be warranted, if for no other reason than to demonstrate the difficulties encountered in attempting to determine what constitutes a reasonable margin or error in preparations of this type

The factors largely responsible for variations in the weight of pills made by the pharmacist are undoubtedly (1) the nature of the excipient used, (2) personal equation and (3) the loss in weight on standing To determine to what extent each of these factors contribute to the total error, the studies reported in this paper were undertaken

---

* Joint Session, Scientific Section and Section on Practical Pharmacy and Dispensing, Washington meeting, 1934

[1] In collaboration with A G DuMez, Professor of Pharmacy School of Pharmacy University of Maryland

[2] Jour A Ph A, 22 (1933) 755, 838, 23 (1934), 350, 421

EXPERIMENTAL PART

A variety of liquid excipients are used in the compounding of pill masses Soap and water honey or glucose are probably as extensively used as any of them They were, therefore, selected for use in these studies

Three series of experiments were carried out In the first series, tests were made to determine the variation in weight of individual pills in the same batch In the second series, tests were made to determine the effect of the use of different excipients upon weight The principal objective of the third series of tests was to determine the average loss or gain in weight of the batches of pills prepared in the first series after standing for a period of one and two weeks

With these objectives in view the following prescriptions were filled

No 1		No 2		No 3	
℞		℞		℞	
Aloe	2 600 Gm	Aloe	3 250 Gm	Aloe	3 250 Gm
Soap	0 650 Gm	Honey, *q s*		Glucose, *q s*	
Water, *q s*		*To make 10 pills*		*To make 10 pills*	
To make 10 pills		Sig		Sig	
Sig					

In the actual performance of these tests, the pill prescriptions were filled by 100 members of the senior class in dispensing pharmacy at the School of Pharmacy of the University of Maryland under working conditions described in the first paper The completed pills were checked for accuracy with respect to weight by using a prescription balance The standard deviation was computed from the results obtained

In tests made to determine the variation in weight of pills, the students were instructed to mix the powders intimately, then incorporate sufficient excipient to form a plastic mass and divide it into 10 pills In some instances the students used a dusting powder such as lycopodium to facilitate rolling and shaping the pills, while in other instances they were prepared without the aid of a dusting powder

The results of the first series of tests are presented in Tables I, II and III

TABLE I —WEIGHT AND STANDARD DEVIATION IN GRAMS OF BATCHES OF PILLS MADE IN COMPOUNDING PRESCRIPTION NO 1

Batch Number	Weight in Gm.	S D in Gm	Batch Number	Weight in Gm.	S D in Gm.
1	3 969	0 014	51	3 650	0 012
2	3 873	0 009	52	3 500	0 022
3	4 110	0 038	53	3 670	0 028
4	3 532	0 023	54	3 591	0 022
5	4 300	0 038	55	3 585	0 014
6	3 725	0 010	56	3 572	0 034
7	3 870	0 016	57	3 982	0 019
8	3 594	0 026	58	3 575	0 018
9	3 875	0 010	59	3 590	0 022
10	3 650	0 047	60	3 530	0 037
11	3 600	0 011	61	3 575	0 003
12	3 540	0 017	62	3 452	0 003
13	3 475	0 025	63	3 439	0 019
14	3 700	0 026	64	3 390	0 038
15	3 577	0 009	65	3 967	0 033
16	3 685	0 021	66	3 590	0 024
17	3 680	0 032	67	3 480	0 038
18	3 750	0 023	68	3 735	0 018
19	3 770	0 041	69	3 350	0 018
20	3 538	0 032	70	3 652	0 040
21	3 402	0 033	71	3 350	0 033
22	3 620	0 006	72	3 530	0 017

23	4 483	0 041	73	3 395	0 034
24	3 932	0 025	74	3 410	0 046
25	3 573	0 021	75	3 750	0 028
26	3 570	0 037	76	3 900	0 019
27	3 563	0 030	77	3 570	0 019
28	3 740	0 018	78	3 685	0 016
29	3 670	0 018	79	3 592	0 029
30	3 770	0 012	80	3 550	0 009
31	3 820	0 028	81	3 275	0 018
32	3 730	0 031	82	3 970	0 032
33	3 701	0 068	83	3 805	0 017
34	3 280	0 021	84	3 370	0 023
35	4 250	0 004	85	3 575	0 030
36	4 100	0 008	86	3 460	0 028
37	4 170	0 021	87	3 520	0 023
38	3 342	0 003	88	3 750	0 019
39	3 562	0 021	89	3 502	0 022
40	3 492	0 041	90	3 540	0 008
41	3 620	0 038	91	3 650	0 017
42	3 585	0 023	92	3 490	0 029
43	3 677	0 020	93	3 871	0 007
44	3 750	0 021	94	3 565	0 023
45	4 001	0 022	95	3 190	0 010
46	3 765	0 038	96	3 580	0 023
47	3 595	0 034	97	3 655	0 019
48	3 680	0 021	98	3 502	0 042
49	3 735	0 015	99	3 650	0 013
50	3 940	0 030	100	3 530	0 034

Average weight of batch (10 pills) = 3 659 Gm
Average standard deviation of batches = 0 024 Gm

TABLE II —WEIGHT AND STANDARD DEVIATION IN GRAMS OF BATCHES OF PILLS MADE IN COMPOUNDING PRESCRIPTION NO 2

Batch Number	Weight in Gm.	S D in Gm.	Batch Number	Weight in Gm.	S D in Gm.
1	4 352	0 019	51	5 120	0 015
2	4 920	0 019	52	4 945	0 042
3	4 675	0 030	53	5 000	0 044
4	5 165	0 035	54	4 810	0 026
5	5 015	0 013	55	5 075	0 022
6	5 425	0 017	56	4 885	0 027
7	4 430	0 042	57	5 100	0 031
8	5 060	0 062	58	4 895	0 019
9	4 820	0 020	59	4 950	0 039
10	4 440	0 021	60	5 165	0 045
11	4 470	0 028	61	4 975	0 008
12	5 037	0 030	62	4 425	0 022
13	4 950	0 007	63	5 090	0 037
14	5 245	0 004	64	4 889	0 020
15	4 992	0 033	65	4 795	0 028
16	4 710	0 035	66	5 277	0 020
17	4 520	0 030	67	4 387	0 017
18	5 535	0 031	68	4 954	0 011
19	5 852	0 026	69	4 647	0 043
20	5 435	0 061	70	4 850	0 041

TABLE II —*Continued*

Batch Number	Weight in Gm	S D in Gm	Batch Number	Weight in Gm.	S D in Gm.
21	4 800	0 026	71	4 845	0 024
22	5 100	0 023	72	5 210	0 058
23	5 115	0 045	73	3 880	0 043
24	5 655	0 060	74	4 420	0 038
25	4 835	0 006	75	4 509	0 032
26	4 300	0 026	76	4 390	0 028
27	4 097	0 035	77	4 340	0 023
28	5 065	0 054	78	4 800	0 032
29	5 560	0 035	79	5 175	0 023
30	5 168	0 034	80	5 020	0 033
31	4 840	0 026	81	4 930	0 023
32	4 725	0 037	82	4 740	0 033
33	4 600	0 030	83	3 700	0 021
34	5 290	0 022	84	5 120	0 034
35	4 757	0 051	85	4 890	0 031
36	4 450	0 008	86	4 000	0 034
37	3 150	0 007	87	5 100	0 045
38	5 300	0 016	88	4 640	0 031
39	5 469	0 021	89	4 889	0 004
40	3 451	0 025	90	4 825	0 023
41	4 652	0 033	91	4 500	0 038
42	4 950	0 019	92	4 840	0 004
43	4 660	0 024	93	5 305	0 013
44	4 520	0 023	94	6 755	0 015
45	5 000	0 033	95	4 920	0 034
46	4 900	0 040	96	4 650	0 062
47	4 895	0 018	97	4 550	0 055
48	4 605	0 043	98	4 700	0 023
49	4 757	0 040	99	4 360	0 031
50	5 180	0 050	100	4 350	0 020

Average weight of batch (10 pills) = 4 795 Gm

Average standard deviation of batches = 0 029 Gm

TABLE III —WEIGHT AND STANDARD DEVIATION IN GRAMS OF BATCHES OF PILLS MADE IN COMPOUNDING PRESCRIPTION No 3

Batch Number	Weight in Gm	S D in Gm	Batch Number	Weight in Gm	S D in Gm.
1	6 075	0 054	51	6 550	0 036
2	3 865	0 002	52	3 300	0 028
3	3 710	0 023	53	5 505	0 055
4	7 010	0 031	54	4 900	0 045
5	7 065	0 035	55	6 102	0 035
6	5 015	0 042	56	5 680	0 027
7	5 775	0 035	57	7 940	0 040
8	5 260	0 027	58	8 870	0 048
9	5 460	0 015	59	5 395	0 041
10	6 370	0 021	60	5 360	0 030
11	5 075	0 011	61	6 330	0 064
12	5 470	0 043	62	5 615	0 007
13	5 097	0 045	63	5 620	0 018
14	5 675	0 039	64	6 000	0 037
15	6 750	0 019	65	5 900	0 032
16	5 808	0 051	66	5 130	0 022

17	5 042	0 021	67	4 350	0 019
18	4 840	0 035	68	4 790	0 012
19	5 300	0 032	69	6 625	0 042
20	5 895	0 028	70	4 620	0 010
21	6 246	0 042	71	5 130	0 036
22	4 878	0 046	72	5 670	0 052
23	5 604	0 040	73	7 870	0 038
24	6 195	0 038	74	6 445	0 075
25	6 552	0 048	75	4 650	0 051
26	7 040	0 007	76	5 500	0 052
27	3 890	0 038	77	5 176	0 030
28	7 360	0 062	78	5 170	0 008
29	5 450	0 055	79	5 670	0 022
30	7 450	0 058	80	5 385	0 041
31	7 380	0 010	81	5 960	0 025
32	6 330	0 048	82	4 485	0 028
33	6 437	0 029	83	5 675	0 022
34	5 755	0 033	84	4 794	0 019
35	6 473	0 055	85	5 330	0 015
36	6 089	0 019	86	5 445	0 021
37	7 120	0 007	87	4 640	0 035
38	5 625	0 019	88	4 312	0 036
39	5 110	0 020	89	4 900	0 039
40	8 155	0 022	90	5 501	0 042
41	5 880	0 021	91	4 834	0 009
42	5 702	0 055	92	5 740	0 025
43	5 230	0 029	93	4 005	0 028
44	7 110	0 035	94	4 770	0 005
45	5 667	0 044	95	7 908	0 015
46	5 385	0 047	96	5 320	0 011
47	5 150	0 037	97	5 960	0 052
48	6 200	0 026	98	4 310	0 027
49	5 210	0 046	99	4 590	0 030
50	6 100	0 028	100	5 910	0 032
				5 689 Gm	
Average weight of batch (10 pills) =					
Average standard deviation of batches =					0 032 Gm

In Table I, which gives the average weight and the standard deviation of each of the individual batches of pills called for in prescription No 1, it will be observed that in this series of tests the average weight of a total of the 100 batches is 3 659 Gm or an increase of 0 409 Gm over the theoretical weight before adding the excipient On further examination it will be observed that the average standard deviation is 0 024 Gm Sixty of the batches of pills filled fall within the average standard deviation, or 0 024 Gm , thirty-nine batches fall within twice the average standard deviation, or 0 048 Gm , while one batch (No 33) falls within three times the average standard deviation, or 0 072 Gm

In Table II, the results show that the average weight has increased 1 545 Gm over the theoretical weight of 3 250 Gm on adding honey as the excipient The average standard deviation for this series is 0 029 Gm Fifty of the batches of pills filled fall within the average standard deviation of 0 029 Gm , forty-six fall within twice the average standard deviation, or 0 058 Gm , while the remaining four batches fall within three times the average standard deviation, or 0 087 Gm

In Table III, it will be observed there is an average increase of 2 439 Gm over the theoretical weight of 3 250 Gm when glucose is added as the excipient The average standard deviation for this series of tests is 0 032 Gm Fifty one of the batches of pills filled fall within the average standard deviation of 0 032 Gm, forty-eight batches fall within twice the average standard deviation, or 0 064 Gm, while the one remaining batch falls within three times the average standard deviation, or 0 096 Gm

The data obtained in this series of tests show that the use of different excipients in massing the same ingredients has a marked effect upon the weight of the completed pills The increase in the average weight and in the average standard deviation on adding different excipients is in the following order (1) soap and water, (2) honey and (3) glucose

(To be continued)

NOTES ON EARLY DRUG LEGISLATION *

BY F W NITARDY

Recent discussions of drug control by the Federal Government have been chiefly restricted to the problems of the present century Readers might conclude from these discussions that the passage of the present federal law in 1906 was the first considerable achievement in favor of the consumer, and that in the absence of public interest this was instigated and largely supported by a Government bureau, the Department of Chemistry Even a casual investigation of the periodical literature of the past century will change such view The Food and Drugs Act of 1906 was not the first legislation of its kind nor was its passage accomplished by an individual or a group of individuals as a result of a few years of agitation This legislation was the outgrowth of over half a century of effort in which laymen, physicians, pharmacists and drug manufacturers alike participated The following isolated instances, while not in any sense representing a complete résumé of the subject, illustrate the extent and ramifications of the campaign to obtain pure drugs for the consumer and professions of medicine and pharmacy

As early as 1848 Congress passed an "Act to prevent the importation of adulterated and spurious drugs and medicines" In its original form it had been introduced into Congress early in the year and was supported by memorials from various organizations including the American Medical Association, Surgeons in the Army and Navy, the physicians and apothecaries of the District of Columbia and by circulars published by the College of Pharmacy of New York in which attention had been publicly drawn to the large quantities of sophisticated chemical and pharmaceutical preparations imported The gross adulteration of drugs such as opium, blue pill mass and quinine sulphate had been described by Dr M J Baily, examiner of drugs at the New York Customhouse, who further reported in hearing before the House Committee that more than one-half of many of the most important chemical and medical preparations together with large quantities of crude drugs, arrived in this country so much adulterated or otherwise deteriorated as to

* Section on Historical Pharmacy, A PH A, Washington meeting, 1934

render them not only worthless as medicine, but often dangerous This Act, as approved on June 26, 1848, required examination of products used wholly or in part as medicine, at the port or entry, for quality, purity and fitness for medical purposes Such products found adulterated or deteriorated so as to render them inferior in strength and purity to the standard established by the United States, Edinburgh, London, French and German pharmacopœias and dispensatories, and thereby improper, unsafe or dangerous to be used for medicinal purposes were refused passage The owner had option of requesting reexamination of strictly analytical character at his own expense, and if the examiners' rejection was sustained, the privilege of reexporting the material within 6 months after payment of costs and depositing surety bond In lieu of such reexportation within the specified period the material was to be destroyed by the Collector Special examiners were appointed for this work, salaries of $1600 00 for the Port of New York and of $1000 00 for other ports were specified [1] Early in 1849 the Act was amended to improve the salaries of special examiners of drugs, medicines, etc

The American Medical Association had appointed a committee to study this question, the members having been instructed "to note all the facts that come to their knowledge, with regard to adulterations and sophistications of drugs, medicines, chemicals, etc" The report made in 1850 discussed both foreign and domestic adulteration In the port of New York, certainly, the quality of imported material had markedly improved since the passage of the federal law On the other hand the law caused certain inconveniences to the manufacturers, largely due to uncertainty with regard to standards In connection with domestic adulteration the Committee mentioned the frequent adulteration of powdered drugs, mercurial preparations, etc It recommended that the state legislatures be requested to pass laws authorizing the appointment of inspectors, and making it a penal offence to deal in adulterated drugs and medicines No such action was taken by the Association but the Committee was continued [2] At the annual meeting of the American Medical Association in 1853, the president's report, referring to good results obtained from the federal law, recommended that individual states be encouraged to study the situation

For some time members of the New York College of Pharmacy had been studying the problem of adulterated drug imports Since the passage of the law of 1848 difficulties were considered to be due chiefly to lack of standards for the guidance of Drug Examiners and to some extent to the appointment of unqualified examiners In 1851 the Board of Trustees of that institution appointed a committee to investigate the subject The Committee considered that other Colleges of Pharmacy should take part and invited the Colleges of Boston, Philadelphia, Baltimore and Cincinnati to send delegates to a Convention to be held in New York on April 24, 1851, for the purpose of recommending a tariff of standards for the use of Drug Inspectors—which it proposed to bring before the National Medical Association, to meet on the 6th of May, at Charleston, S C, that its influence might be brought to bear with Congress Delegates from these institutions did

[1] *Trans Am Med Assoc*, 1 (1848), 336
[2] *Ibid*, 3 (1850), 291–308
[3] *Ibid*, 6 (1853) 77

not arrive but several of them sent communications expressing aproval of the project The duration of the Convention—four days—was such that little was accomplished but the delegates of the New York College adopted the report of their Board of Trustees and sent it to the meeting of the National Medical Asso ciation [1] The recommendation of the Convention with regard to standards was submitted to the National Medical Association with the Report of the Committee on Adulterated Drugs, which unfortunately, was for other reasons refused publica tion by the Association [2] The proposed establishment of standards was fully approved but it was the opinion of the Medical Association that the subject was properly the province of the pharmaceutical profession

A subsequent convention of delegates from the colleges at Philadelphia, Boston and New York was held in October 1851 [3] This convention recommended the adoption of standards for but a few drugs Opium, scammony, elaterium, iodine, gum resins, cinchona bark and rhubarb More important was its action in calling a further convention to be held in Philadelphia a year later to consider the formation of a National Association to meet every year This was the beginning of the AMERICAN PHARMACEUTICAL ASSOCIATION

In 1857 the Treasury Department published the regulations, explanations and standards which had been adopted up to that time

The AMERICAN PHARMACEUTICAL ASSOCIATION, in its *Proceedings* of this period, repeatedly mentioned adulteration of imported drugs and apparently decided that its continuance was due to unqualified examiners, for in 1858 it presented a petition to Congress describing evasion of the law of 1848 by reship ment from port of rejection to other ports where less vigilance was employed in examination It requested amendments to the law which would change the mode of appointment of examiners, increase in salaries of examiners and the furnishing of chemicals so that examiners might apply chemical tests when necessary to de termine quality of drugs [4]

By 1861 the incorporated medical and pharmaceutical bodies of the collection district of New York had proposed, through a joint committee, to take some de-cided action to secure the proper execution by the Federal Administration of this law to prevent the importation of adulterated and spurious drugs and medicines The Committee appointed by the Medical Society of the State of New York con sisted of Drs Frank H Hamilton, John H Griscom and Edward R Squibb The joint committee comprised also committees appointed from the Kings County Medical Society, the New York County Medical Society, the New York Academy of Medicine and the New York College of Pharmacy This joint committee sent memorials to President Lincoln and to the Secretary of the Treasury, Salmon P Chase, protesting the necessity of appointing as examiners under the law of 1848 candidates who were graduates of medical or pharmaceutical colleges and whose competency had been established by the medical boards of examination of the Army and Navy Copies of similar memorials were sent to the Secretary of the

[1] *Am J Pharm*, 23 (1851), 288
[2] *Trans Am Med Assoc*, 6 (1853), 77
[3] *Am J Pharm*, 24 (1852), 22
[4] PROC A PH A, 7 (1858), 234

Treasury by several of the New York hospitals, by two prominent New York pharmacists, three druggists and importers, and two importers The Colleges of Pharmacy of Boston, Philadelphia, Baltimore and Chicago took similar action In spite of such representations the next Examiner for the Port of New York, although in early life a druggist, was said to have had slight suitability for the work and to have been appointed for "strong political reasons"[1]

At the annual meeting of the American Medical Association in 1860 a committee consisting of Drs Joseph Carson, Henry J Bowditch and E R Squibb, was appointed to report on the "Practical Working of the U S Law to Prevent the Importation of Adulterated and Spurious Drugs and Medicines" No report was made but the committee was reappointed in 1863 In 1864, it was found impossible on account of lack of accordance to prepare a report, and the committee was discharged At the time of the discharge, Dr Edward R Squibb presented in the form of a paper such data as had been collected by him His conclusions make it evident that the law was not administered in a manner satisfactory to the ethical manufacturer He stated, "This law to prevent the importations of adulterated and spurious drugs and medicines has not prevented, and does not now prevent, such importations" He considered the principal reasons why it did not to a much greater extent fulfil its important objects to be the failure of the Secretary of the Treasury to appoint "suitably qualified persons" and because the incumbents of the more important of these offices failed to perform diligently and faithfully the duties of the office, as prescribed by the act He further claimed that the standards used by these examiners were uniformly below those specified by the U S Pharmacopœia

> "For some time after the passage of the law, numerous instances of rejection of most of the common drugs were heard of, and these continued some time after the operation of the law had made it known at the sources from whence these foreign drugs come Inferior foreign drugs, however, were never absent from the market at any time, and the effect of the law seemed rather that of increasing the proportion and the demand for good drugs than of excluding bad ones
> A little later in the history of its application, however, glaring instances of maladministration appeared to become more numerous, and political party influences took possession of the offices under the law, so that by the year 1860, when the Association's first committee was appointed abundant evidence could be adduced to show that the law was rarely administered at all, and that its value to the medical profession consisted mainly in its existence upon the statute book"[2]

In 1868 the AMERICAN PHARMACEUTICAL ASSOCIATION appointed a committee to draft a law regulating the entire practice of pharmacy This committee, reporting in 1869, proposed a law intended also to prevent adulteration of drugs and medicines Section 16 of this law would have made it illegal to mix knowingly any inert or foreign substance with drugs or medicinal preparations with the effect of weakening or destroying medicinal power, or to sell the same otherwise than in the unbroken original package put up by the manufacturer or to sell such unbroken package knowing the article contained therein to be so adulterated Discussion of the proposed law as reported in the PROCEEDINGS did not cover this section but was restricted largely to that portion covering the qualification of pharmacists The ASSOCIATION could not agree upon the Committee report and did not approve

[1] *Trans Med Soc State of New York* (1862) 423
[2] *Trans Am Med Assoc* 15 (1865), 141–150

it It did, however, send copies of the proposed law to the legislatures of the various states suggesting the desirability of enacting legislation on the subject [1]

The singular lack of agreement over the necessity for stringent Government control of drugs has been evident for a great many years In 1879 a committee appointed by the Philadelphia Drug Exchange to consider the need for such legislation reported that adulteration was of limited extent The Board of Directors adopted this report which expressed opposition to legislation owing to the difficulty of wise and just administration, the possibility of financial losses resulting from price changes occurring during the examination of drugs and the difficulties of fixing of responsibility for adulteration [2]

Legislation to prevent the adulteration of drugs and medicines was considered in 1878–1879 by a committee composed of representatives from the New York Academy of Sciences, the New York Academy of Medicine, the New York County Medical Society, the Therapeutical Society, the New York College of Pharmacy, the New York Medico-Legal Society, the Public Health Association and the American Chemical Society [3]

In 1879, Dr Edward R Squibb proposed an "Act to Prevent the Adulteration of Food and Medicine"[4] which is interesting because of its severity and because it included also cosmetics He proposed that for the purpose of this law, the term "Food" should include every article used for food or drink or in food and drink, of man and animals, and that the term "Medicine" should embrace every article, other than food and drink, used for the preservation of health, or for the relief or cure of disease in man or animals, including antiseptics and disinfectants and cosmetics As standards he specified the U S Pharmacopœia for articles embraced by that authority, and for other articles the national pharmacopœias of other countries or other commonly accepted standard authority He defines adulteration as (1) the adding of one or more substances to another or others whereby the strength, purity, quality or true value of the resulting substance or mixture is reduced or lowered from its original or true value, (2) the substitution of one substance for another, (3) the abstraction of any part of any substance with the effect that the separation shall reduce that value of the substance, (4) the application of a name commonly known or understood to indicate any substance, to any part or parts thereof, or to any other substance, (5) the presence in any substance of any impurity, or any foreign matter that is either natural or accidental to it, if in unusual proportion, (6) the admixture of different qualities of the same substance with the effect of tending to deception and fraud, (7) any debasement or dilution of any substance whereby it is reduced in intrinsic value, and is yet liable to be given, bought, sold or used as though it were not debased or diluted, (8) any coloring, coating, polishing or powdering, or any other alteration in the physical condition or sensible properties of any substance, with or without addition to, or subtraction from it, whereby damage is concealed, or it is made to appear better and greater than it really is, either in quality, weight or measure, or whereby im

[1] YEARBOOK, A PH A , 17 (1869), 51–56

[2] *Natl Board of Health Bull* , 2 (1880–1881), 522

[3] Squibb, *Trans Med Soc State of New York* (1879), 209

[4] *Trans Med Soc State of New York*, "Economic Monograph No XIV," G P Putnam's Sons (1879)

purities or defective quality are partially or wholly masked or hidden, (9) the giving or selling or offering for sale, or the possession of any adulterated article by any person whose business it is to make or to deal in articles of food or medicine It is declared that "the sole and entire object and intention of this law [is] to protect the public against deception and fraud in the cost and quality of food and medicine through adulteration "[1]

In 1881, legislatures of New Jersey and New York passed practically identical laws controlling Food and Drug adulteration They required that "drugs must conform to the U S P standards or if not sold under or by a name recognized in the U S P must not differ materially from standards laid down in other pharmacopœias or standard works of Materia Medica " They also specified that prosecution under the law be based on analysis requested by an agent or board of health appointed under the act State legislation was passed in Michigan during the same year and in 1882 by Massachusetts, Minnesota, Tennessee, Texas and Louisiana Several of these laws prescribed no standards for determining adulteration [2] Undoubtedly many of the other states passed similar laws prior to the Federal law of 1906

The above legislation was sponsored by the National Board of Trade and National Board of Health A bill prepared by a committee of experts under direction of the former organization was also introduced before the Senate of the 47th Congress by Mr Miller of New York on Dec 20, 1881 In its definition of adulterated drugs this bill resembled the present Food and Drugs Act but was much broader since it covered also drugs sold under or by names not recognized in the United States Pharmacopœia [3] This bill was criticized by Dr Edward R Squibb because it made no legal provision for obtaining or identifying samples nor for examining them, but delegated this to the National Board of Health [4] This bill restricted the term "drug" to include medicines for internal or external use It did not therefore attempt to control the composition of cosmetics

In 1883 Dr Harvey W Wiley became Chief of the Division of Chemistry in the Department of Agriculture and soon thereafter began his efforts to force the passage of federal legislation on adulteration of food and drugs The subsequent history of the movement and the passage of the Food and Drugs Act of 1906 is described in Dr Wiley's Autobiography published in 1930 It is evident, however, from the material discussed above that the passage of such legislation was to a considerable extent due to the continued attempts of various individuals and scientific and professional organizations to obtain similar regulation

---

[1] *Trans Med Soc State of New York* (1879) 214–221

[2] YEARBOOK A PH A, 29 (1881), 369, 30 (1882), 391–395

[3] *Natl Board of Health Bull*, 2 (1880–1881), 664

[4] *Ephemeris* 1 (1881) 21

PHARMACY WEEK WINDOW DISPLAY COMMITTEE

The following committee members will serve as judges of the 1934 Window Display Contest *Chairman*, Dean John F McCloskey, Loyola University, New Orleans College of Pharmacy, E V Kimzey and J Culver, wholesale druggists, P Grossman and A Worner, retail pharmacists, all of New Orleans

AMENDMENTS TO THE FEDERAL FOOD AND DRUGS ACT PROPOSED BY DRS WILEY AND KEBLER NEARLY A GENERATION AGO *

BY LYMAN F KEBLER [1]

The present agitation for amending or repealing the Food and Drugs Act of 1906 brings to mind many past activities and accomplishments One frequently hears it said that cosmetics were not of sufficient importance, or prominence, previous to or at the time this law was enacted, to include them in the legislation In this connection it may be interesting to note that cosmetics, for ages, played a prominent part in the make-up of the fairer sex, to enhance their attractiveness and to please mankind Like all good things, their use has increased with prosperity, the fashions and demands of the time

Cosmetics were used in such abundance, even in the sixties, that they were included[2] among the products for raising revenue, to pay the indebtedness caused by the rebellion in our country Congressman Marriott Brosius included cosmetics in his first food and drug bill (*H R 5441*), introduced December 18, 1897 He included them in several subsequent bills but they were omitted from his last two bills Cosmetics were made a part of the District of Columbia Food and Drug Law, approved February 17, 1898 On March 4, 1898 the National Pure Food and Drug Congress, comprising over 250 delegates, amended and adopted the then pending Brosius bill, which amended bill included cosmetics Companion bills in the Senate at the time, also covered cosmetics Due to the opposition that developed to the inclusion of drugs generally, in a law to be administered by the Department of Agriculture certain bills covered foods and pharmacopœial drugs only Cosmetics went out of the picture for many years but were again brought forward in time

In view of the fact that there have been such determined efforts made to supplant the present Food and Drugs Act in some quarters, rather than to amend it, let us see what Dr Wiley and others thought about amending it in 1911 and 1912 The purpose of the amendments was to heal the breach caused by the United States Supreme Court decision in a case involving an alleged cancer cure, to cover cosmetics and therapeutic devices, to reach false and misleading advertising separate and apart from the package, to increase the number of drugs to be declared on the label, to control unscrupulous parties sending medicines directly to the consumer and to reach other features These amendments cover the essential features of the bills introduced in Congress in 1933 and 1934, excepting food standards

The request for making food standards was embodied in a goodly number of the early bills and always met defeat Dr Wiley was reluctant to take up this feature in the proposed legislation Food standards was one of Dr Wiley's hobbies but he knew from experience the temper and power of the interests involved I think all will agree that with his vast experience in food and drug legislation, Dr Wiley was eminently qualified to propose and prepare effective amendments

* Section on Education and Legislation, A PH A Washington meeting 1934.

[1] Former Chief of Drug Division, Bureau of Chemistry, United States Department of Agriculture

[2] U S Stat at L 12, 484 (1862)

to the Federal Pure Food law It is likewise evident that with the multiplicity of Federal, State and Municipal legislation, affecting foods, drugs and public health, that the various enforcing officers, chemists, druggists, physicians, attorneys, consumers, advertising agencies, the business interests involved and others, were keenly alive and sensed the justice or otherwise, of amendments that may be proposed to existing laws or the enactment of new laws on these subjects

A FEW SALIENT FEATURES IN FOOD AND DRUG LEGISLATION

In order that our memories may be refreshed, permit me to briefly call attention to a few of the salient mile-posts on the way to the enactment of the Pure Food Law The quality of the medicines and chemicals imported into the United States during the first half century of her existence were exceedingly poor in character Apothecaries, physicians and chemists became greatly aroused As a result of the agitation that developed a law was passed in 1848,[1] prohibiting the importation of spurious and adulterated drugs and medicine The standards recognized were "the United States, Edinburgh, London, French and German pharmacopœias and dispensatories" This safeguarded the sick so far as imports were concerned, but nothing was done to control the purity of domestic medicines for many years thereafter Strange as it may seem, a fairly efficient food and drug law was passed in the state of California in 1872 [2] The United States Congress in 1878[3] enacted a law for the District of Columbia, penalizing pharmacists who adulterated their drugs, chemicals and medicines

Congressman H B Wright of Pennsylvania introduced the first Federal Food Bill in the United States Congress, January 20, 1879 It covered foods only and was a good bill for a beginning, but died in Congress The same bill was reintroduced in the next Congress by Representative R L T Beale of Virginia, May 23, 1879, and made some progress, but also came to naught The subject, however, created a great stir at the time, particularly by George T Angell, a prominent, wealthy and experienced Boston attorney, who had the health and welfare of humanity at heart This publicity resulted in the National Board of Trade, at its annual meeting in December 1879, offering $1000 00 in prizes for a draft of a "Food Adulteration Act" The same year Congress authorized the formation of a "National Board of Health" In 1880 the report on the above prizes appeared[4] together with a draft of a proposed Food and Drug Law, by the National Board of Health, based on the first prize essay, by Dr G W Wigner of England, where a similar law had been in operation for a number of years It may be of interest to note that Dr Wigner's prize essay contains the essentials and is the basis of most of the general food and drug laws enacted in the United States, so far as adulteration is concerned

In 1881 one food and drug bill was introduced in the Senate and three in the House All were based on the Wigner prize essay Over one hundred food and drug bills were introduced in the United States Congress from 1879 to 1906, inclusive

---

[1] U S Stat at L 9, 237
[2] Penal Code, page 93
[3] U S Stat at L 20 137
[4] *Proc Nat Bd Trade*, 11, 75

UNITED STATES SUPREME COURT DECISION MAKES BREACH ON LAW

Dr H W Wiley was appointed Chief of the Bureau of Chemistry, United States Department of Agriculture in 1883 and soon thereafter began to take part in the proposed food and drug legislation There was probably no one better qualified than Dr Wiley to see through some of the machinations resorted to, to frustrate the passage of such a law or make it innocuous after its enactment He recommended and made numerous suggestions and amendments to the various bills that were proposed over a period of nearly a quarter of a century His interests were primarily centered in foods Drugs were largely incidental He relied generally on the advice of others in case of medicines

I became identified with the work as Chief of the Drug Laboratory in 1903 Dr Wiley delegated the drug work to me, including the legislative activities I was to keep him advised There was, as stated above, a vast amount of opposition in some drug quarters to a national law controlling the quality of drugs, but after the law was passed in 1906, the drug trade generally supported it We were making good progress with its enforcement, when like a thunderbolt came a Federal Circuit Court decision holding that the Act did not cover therapeutic claims The case was appealed to the United States Supreme Court This Court sustained the lower court, one reason being that it was enforced in the Bureau of Chemistry The language generally believed controlling, in the case of drugs, Section 8, reads, "That the term 'misbranded' as used herein shall apply to all drugs the package or label of which shall bear any statement, design or device regarding such article, or the ingredients or substances contained therein which shall be false or misleading in any particular " The Supreme Court, in a divided opinion, 6 to 3, held that this language covered adulteration but did not reach curative claims The fact that nine of the most eminent jurists disagreed on the meaning of this section of the law, shows that it was not clear and definite in spite of its constructive criticisms by many attorneys of the land

Amendments to this law were proposed before it actually went into effect About a dozen bills to amend the Act had been introduced in Congress up to the time the United States Supreme Court handed down its decision in the Johnson cancer cure case, May 29, 1911 This decision necessitated the abatement of a large number of cases under consideration, some of which were in court Alleged cancer cures were considered among the most flagrant violations under the law We felt rather jubilant that the defendant was courageous enough to contest the case in court There was little doubt in our minds as to the final outcome, but we were greatly disappointed The flood-gates of former days of flamboyant curative claims were thrown wide open There was rejoicing in some camps and certainly depression among those enforcing the food laws

PRESIDENT TAFT'S SPECIAL MESSAGE TO CONGRESS

President William H Taft fully appreciated the seriousness of the situation, as is tersely shown by the following, now historic, special message he sent to Congress

PURE FOOD AND DRUGS ACT

The Vice-President laid before the Senate the following message from the President of the United States (House Doc No 75), which was read

To the Senate and House of Representatives

Your attention is respectfully called to the necessity of passing at this session an amendment to the food and drugs act of June 30, 1906 (*34 Stat., 768*) which will supplement existing law and prevent the shipment in interstate and foreign commerce and the manufacture and sale within the Territories and the District of Columbia of worthless nostrums labeled with misstatements of fact as to their physiological action—misstatements false and misleading even in the knowledge of those who make them

On June 30, 1906, after an agitation of 20 years the food and drugs act, passed by the Fifty ninth Congress, received the approval of the President and became law The purpose of the measure was twofold—*first* to prevent the adulteration of foods and drugs within the jurisdiction of the Federal Government, and *second* to prevent any false labeling of foods and drugs that will deceive the people into the belief that they are securing other than that for which they ask and which they have the right to get The law was received with general satisfaction and has been vigorously enforced More than 2000 cases have been prepared for criminal prosecution against the shippers of adulterated or misbranded foods and drugs and seizures have been made of more than 700 shipments of such articles More than two thirds of these cases have been begun since March 4, 1909 Of the criminal cases more than 800 have terminated favorably to the Government, and of the shipments seized more than 450 have been condemned and either relabeled or destroyed In every case in which the food seized was deleterious to health it was destroyed A large number of cases are now pending

The Supreme Court has held in a recent decision (*United States vs O A Johnson opinion May 29, 1911*) that the food and drugs act does not cover the knowingly false labeling of nostrums as to curative effect or physiological action, and that inquiry under this salutary statute does not by its terms extend in any case to the inefficacy of medicines to work the cures claimed for them on the labels It follows that, without fear of punishment under the law, unscrupulous persons knowing the medicines to have no curative or remedial value for the diseases for which they indicate them, may ship in interstate commerce medicines composed of substances possessing any slight physiological action and labeled as cures for diseases which, in the present state of science, are recognized as incurable

An evil which menaces the general health of the people strikes at the life of the Nation In my opinion, the sale of dangerously adulterated drugs or the sale of drugs under knowingly false claims as to their effect in disease, constitutes such an evil and warrants me in calling the matter to the attention of the Congress

Fraudulent misrepresentations of the curative value of nostrums not only operate to defraud purchasers but are a distinct menace to the public health There are none so credulous as sufferers from disease The need is urgent for legislation which will prevent the raising of false hopes of speedy cures of serious ailments by misstatements of fact as to worthless mixtures on which the sick will rely while their diseases progress unchecked

At the time the food and drugs act was passed there were current in commerce literally thousands of dangerous frauds labeled as cures for every case of epilepsy, sure cures for consumption and all lung diseases, cures for all kidney liver and malarial troubles cures for diabetes cures for tumor and cancer, cures for all forms of heart disease, in fact, cures for all the ills known at the present day The labels of many of these so called cures indicated their use for diseases of children They were not only utterly useless in the treatment of the disease, but in many cases positively injurious If a tithe of these statements had been true, no one with access to the remedies which bore them need have died from any cause other than accident or old age Unfortunately the statements were not true The shameful fact is that those who deal in such preparations know they are deceiving credulous and ignorant unfortunates who suffer from some of the gravest ills to which the flesh of this day is subject No physician of standing in his profession no matter to what school of medicine he may belong, entertains the slightest idea that any of these preparations will work the wonders promised on the labels

Prior to the recent decision of the Supreme Court the officers charged with the enforcement of the law regarded false and misleading statements concerning the curative value of nostrums as misbranding and there was a general acquiescence in this view by the proprietors of the nostrums Many pretended cures, in consequence, were withdrawn from the market and the proprietors of many other alleged cures eliminated false and extravagant claims from their labels

either voluntarily or under the compulsion of criminal prosecution Nearly 100 criminal prosecutions on this charge were concluded in the Federal courts by pleas of guilty and the imposition of fines More than 150 cases of the same nature, involving some of the rankest frauds by which the American people were ever deceived, are pending now, and must be dismissed

I fear, if no remedial legislation be granted at this session, that the good which has already been accomplished in regard to these nostrums will be undone, and the people of the country will be deprived of a powerful safeguard against dangerous fraud Of course, as pointed out by the Supreme Court, any attempt to legislate against mere expressions of opinion would be abortive, nevertheless if knowingly false misstatements of fact as to the effect of the preparations be provided against, the greater part of the evil will be subject to control

The statute can be easily amended to include the evil I have described I recommend that this be done at once as a matter of emergency

The White House, June 20, 1911 Wm H Taft

President Taft stressed the necessity of controlling "knowingly false misstatements of fact" but cautioned against legislation covering "mere expressions of opinion "

BILLS INTRODUCED TO REMEDY THE BREACH

On the same day that the President sent his message to Congress, Representative Swager Sherley introduced a bill to amend Section Eight, dealing with misbranding, to remedy the breach caused by the United States Supreme Court decisions Senator McCumber introduced a companion bill (*S 2849*) in the Senate, June 22, 1911 Hon William Richardson introduced several bills for the same purpose, one June 24th, another July 5th and a third December 4th, all during 1911 Dr Wiley and I were called on to draft suggestions regarding certain amendments proposed in the Richardson bill Hearings were had on the December 4th bill, H R 14060, which embodied all of the amendments in the Richardson bills Other proposed amendments then pending also came up for consideration, particularly the Sherley bill, H R No 11877 The hearings were held before the Committee on Interstate and Foreign Commerce, House of Representatives, 62nd Congress, 2nd Session, April 23rd to 29th, inclusive

Mention should be made that Dr Wiley retired to private life, April 1, 1912, and I was directed by Secretary Wilson to give the Committee every possible assistance This all followed shortly on the heels of the unfortunate attacks made on us in the Department Even though we were exonerated I was not feeling at my best to handle the various problems raised I called on my former Chief for advice and assistance

AMENDMENTS PROPOSED FOR SECTION SIX

The following amendments were embodied in Section Six of this bill

"Or device," ' also soda and potash lye, also cosmetics, hair preparations and dyes and toilet preparations, also tobacco, snuffs, tobacco substitutes and all tobacco products "

Based on my experience and knowledge I suggested the inclusion of devices and cosmetics The lye and tobacco features were included by request, as will be noted later During the hearings, about a dozen of assorted devices or therapeutic devices, as we called them later, were shown, a partial list of which will be found on page 45 of the hearings, 1912

Therapeutic devices were never to my knowledge included in this type of legislation before

The question was raised as to the propriety of including devices under the heading of drugs, as is shown by the following

Mr Esch Doctor, do you see any inconsistency in declaring by statute that these mechanical devices are drugs? That is what that section does

Dr Kebler Congress can declare anything a drug if it wants to

Mr Esch. If that meaning is not in the dictionary could we give any interpretation we see fit as to words?

Dr Kebler Oh, yes, there is no question about that

Mr Stevens But we can t declare that to be a fact which is not a fact?

Dr Kebler These commodities are used for the treatment of diseases

Mr Esch One of the amendments is that the term ' drug" shall include 'device," and your interpretation of "device" is made clear by these mechanical devices

Dr Kebler Yes, and also they carry with them an element of medication, as a rule

Mr Esch That might be so of that

Dr Kebler Here is one (indicating) which you will find contains a little battery inclosed in it somewhere, or it is to be attached to a battery, for the purpose of conducting electricity

Mr Esch I know that would not be a drug

Dr Kebler Electro therapeutics is considered under that line

Mr Esch. It is used as a medication not as a drug

Dr Kebler It is a therapeutic agent, we have it as a part of the medical course in every up to-date medical school

Mr Esch The point I am trying to get at is whether we ought to make such a declaration in this section or to provide a separate section covering devices

Dr Kebler Well, of course, that is for Congress, or this committee, to determine, not for me But I think it could easily be covered there, because they are so analogous to the ordi nary agents that are used for the treatment of diseases, and are supposed to have the same effect

After this questioning by Congressman Esch, and questions raised by others, Dr Wiley and I felt that it would be unwise to push the matter We were not interested in distorting the dictionary meaning of terms used in the law, because we had to resort to dictionaries in our work and believed it injudicious to set an example that might cause embarrassment later, but we were not prepared to amend the law by proposing a new section covering therapeutic devices at the time I was rather surprised that no one raised a question about stretching the term "drug" during the two hearings of Senator Copeland's bills, S 1944 and S 2800, in 1933 and 1934, respectively And these bills covered every sort of device, even those that might aid in the function of man or other animals The question of distorting the dictionary meaning of terms seemed to be lost sight of by all parties concerned They were to be called drugs as a matter of course

In the enforcement of the law we came across a goodly number of cosmetics which we believed should be controlled in the same manner as foods and drugs were controlled Attention was called by name to an assortment of these products on the market at the time, containing deleterious agents, among which may be named corrosive sublimate, white precipitate, silver nitrate, soluble lead salts and paraphenylendiamin, an aniline derivative Some of these cosmetics were reported at times to produce harmful results to the user In most cases there probably was a supersensitiveness or idiosyncrasy on the part of the user, or the product may not have been applied according to directions

No objections were made at the time of the 1912 hearings to the inclusion of cosmetics under the definition of drugs, in the law A partial list will be found on pages 42 and 91 of the hearings

Soda and potash lye were introduced at the request of the manufacturing industry The substitution of soda lye, the cheaper product, for potash lye, was a common practice In many instances soda lye is as useful as potash lye, but for some purposes it is entirely unsuited and may result in damage

Tobacco and tobacco products were included at the request of Senator Taylor of Tennessee He called attention to serious cases of adulteration and misbrand ing Among the harmful adulterants reported may be mentioned arsenic and lead The arsenic came from the sprays used to control the ravages of insect pests Lead in former days came largely from the lead foil in which the tobacco was commonly wrapped Some may also have come from the lead arsenic spray used

As a matter of fact attention was called to the eminent danger to health be cause of the promiscuous and indiscriminate use of arsenic and lead sprays on our foods, in checking the depredation of insect pests Reference was made to the fact that the British Government put a tolerance of 1 4 parts in beverages and about 20 parts of lead per million on foods We felt that the 1906 pure food law covered the addition of these poisons to our foods and should be vigorously en forced At the hearings the old-time question as to the recognition of the Home opathic Pharmacopœia was raised In fact Senator Gallinger introduced a bill (S 4856) January 29, 1912, providing for the recognition of the Homeopathic Pharmacopœia by the food law After some discussion Dr Kebler said, "I see no objection whatever to introducing into this law a homeopathic pharmacopœia, providing the homeopathic profession gets together and decides on the pharma copœia, and provided further that the standards now in the law are not interfered with" Others expressed similar views It should be said that it was asserted over and over again that the inclusion of the pharmacopœia was delegating power and therefore illegal The U S Pharmacopœia and even the pharmacopœias of certain foreign countries were recognized as standards in the 1848 drug import law and no one had upset that law, after sixty-four years of enforcement, because of this alleged delegation of power

CHANGES SUGGESTED FOR SECTION SEVEN

Section Seven was amended to include the changes embodied in Section Six of the bill and to cover methyl alcohol, which was considered an undesirable constituent of medicines

At the importunities of physicians and the retail drug trade, it was suggested at the hearings that the proviso commonly referred to as the variation clause, be deleted The issue was raised by Chairman Richardson This precipitated an acrimonious discussion on the part of some interests Dr Kebler said, "I did not intend to say anthing on that matter—"* * * * * But after the question was raised he reviewed conditions rather extensively and recommended its elimi nation It was vehemently contended that its elimination would make the law unconstitutional

AMENDMENTS TO SECTION EIGHT DISCUSSED

Section Eight dealing with misbranding was amended to reach all forms of false or misleading advertising, wherever and in whatever manner used, to control, by means of licensing, irresponsible persons sending medicines directly to the consumer, and to increase the number of drugs to be declared on the label

The part dealing with false or misleading advertising of foods or drugs reads "or if the label or labels or any advertisement, poster, circular, or otherwise, contain any false or misleading claims or representations relative to disease or symptoms of disease, to be read or intended to be read by the laity, which are intended or calculated to produce in the minds of persons reading them or to whom the same may be read, a false impression of the existence of disease in their own bodies, or if any statement or expression of opinion concerning its physiological, therapeutic, nutritive or remedial property be made or promulgated in any manner so as to deceive or mislead, or which shall deceive or tend to deceive the purchaser "

Dr Wiley and I were surprised that no material objections were made to this proposed, rather inclusive as we thought, amendment, an amendment that covers advertising in all forms, including curative claims for drugs and nutritional representations for foods

The bill also contained the following additional clause in the matter of publicity, "or when represented to the public in any way as having any remedial property" We suggested that this clause be expunged, believing that the above proposed amendment was all sufficient

HABIT-FORMING AND DELETERIOUS DRUGS TO BE DECLARED IN LABEL

Another misbranding amendment reads

Or if it be a drug offered for sale to the laity, directly or indirectly, which contains any habit-forming or deleterious ingredients to wit acetanilid antipyrin acetphenetidin, anesthesin alcohol, aspirin, alpha and beta eucain, arsenic barium salts carbolic acid, caustic hydroxids, chloroform chloral cocaine creosote, cantharides croton oil, caffein cannabis, heroin, holocain, hydrocyanic acid, lead salts, morphin, methyl alcohol mercury salts, novocain nux vomica orthoform phenacetin the phosphides, theobromin, theophyllin trional, stovain, strychnine vernol yellow phosphorus cotton root ergot pennyroyal, rue savin, tansy the poisonous alkaloids all heart depressants or excitants, or any compound or preparation or derivative of any of the foregoing, and to any food or drug product which is falsely branded as to the State Territory or country in which it is manufactured or produced All these articles or preparations or derivatives shall bear a label containing not only the name by which they are known, but also the names of the parent substances from which they are derived "

No specific opposition to this amplified amendment developed Congressman Covington maintained that the best way to solve this problem would be to require the entire formula on the label Dr Kebler felt that might accomplish a great deal, but that a goodly number of persons would not know what they were taking or what the effects would be The Congressman believed that this course would drive frauds off the market and that legitimate proprietary medicines would find a better market

CONTROLLING IRRESPONSIBLE PARTIES BY A LICENSING SYSTEM

The proposed amendment in the bill to bring this about reads

or if the compounder, manufacturer or vendor thereof is not authorized both under the law of the State or community where the article is produced, manufactured or offered for sale, directly to the consumer, to practice medicine or pharmacy, or both, as the case may be, "

This amendment reaches out into a new field There is, however, something analagous to it in the virus, serum, toxin and antitoxin law [1] We believed it best to pattern after the precedent set in this law and recommended the following

Unless such drug is marked to show that it has been manufactured or compounded by a legally registered or qualified practitioner of medicine or pharmacy who holds an unsuspended or unrevoked license issued by the Secretary of Agriculture, providing the Secretary of Agriculture shall not issue any license to any manufacturer or compounder of any preparation containing any of the substances named above concerning which any false or misleading claims or representations relative to disease or symptoms of disease or statement or fact concerning its remedial or curative property be made or promulgated in any manner "

We knew that this language was defective but hoped that the legal minds at the hearings would whip it into proper form Our experience had been that wholly ignorant, unscrupulous, naive rascals, concoct or had concocted drug mixtures and sent the medicines so concocted to unsophisticated persons in all parts of our fair land The object of this amendment was to put an end to this pernicious business The committee considered the aims of the amendment most worthy and took kindly to it, but some attorneys attacked it fiercely, yet one of them submitted a draft of a bill embodying this feature to be enforced by the Commissioner of Internal Revenue The bill covers certain named habit-forming drugs, provides for a specific tax and requires all dealers handling same to take out a license

At the request of the committee a new bill was drawn up embodying all of the suggested changes Such a bill was prepared by us and printed for the use of the committee But after careful search I was unable to locate a copy In reference to the amended bill and Dr Wiley's views of it, let me quote from the hearing, page 230

Congressman Sabath Would you permit me to ask Dr Wiley a question?

Mr Richardson Certainly

Mr Sabath Have you, or did some one submit to you, this amended bill of Mr Richardson's, as it is now amended by Dr Kebler?

Dr Wiley I wanted to say that I was with Dr Kebler when these amendments were suggested, and I am quite familiar with them and saw the bill when it came up

Mr Sabath What is your opinion, now, upon the bill as amended? Do you think it is a bill which should be recommended and passed?

Dr Wiley I do

Mr Sabath Do you think it will cure a great many defects in the present law?

Dr Wiley It will cure a great many defects in the present law, it will strengthen the bill and will protect the public and will be beneficial all along the line and yet it is far from being what I consider a perfect bill I do not think anybody can draw that bill, except in the light of experience, but in the light of six years' experience in the enforcement of the drug act, I would say that would give immense strength to the law

[1] U S Stat at L 32, pt 1, 728 (1902)

THE FALSE AND FRAUDULENT ENIGMA

One of the alleged weaknesses in the present law is the phrase, "false and fraudulent" This phrase constituted a part of the amendment enacted to cure the defect pointed out by the U S Supreme Court decision Neither Dr Wiley nor I looked with favor on this amendment, we questioned its enforceableness, but the committee in its report H R 1138, 62nd Congress, 2nd Session, 1912, held that the phrase has a well-defined meaning in criminal law, that fraudulent means a deliberately planned purpose and intent to deceive and that it is easily susceptible of proof, which proof the Government is required to establish, by the facts and circumstances in each case It was stressed at the hearings that intent must be proved, that the phrase "false and fraudulent" was essential to meet the decision of the Supreme Court and to make this part of the law constitutional Even though specific proof of intent is not always easy, the committee felt that the Shirley amendment best met the Supreme Court decision, and the views expressed by President Taft in his special message to Congress and recommended its enactment Senator McCumber used the phrase "false or fraudulent" Apparently lawyers differ The Shirley amendment was made part of the law [1] It must be said that this amendment served a useful purpose in curbing many unworthy curative claims and representations Some culprit may escape punishment under this amendment by technicalities, but we must have an abiding faith in the old-time principle that "a person is presumed to be innocent until he is proved guilty"

There seems to be an idea abroad that the present advertising is the worst ever This is erroneous The enforcement of the food and drug law, the postal law and the Federal Trade Commission act have made wonderful changes If anyone doubts it let him go back thirty years and satisfy himself or just read the flamboyant advertisements included in the Richardson Hearings

May I further call attention to the fact that the pharmaceutical profession has for many generations contested adulteration and untruthful advertising

---

THE STABLER-LEADBEATER APOTHECARY SHOP, ALEXANDRIA, VA, 1792–1933 *

BY ELEANOR LEADBEATER

(IN COLLABORATION WITH THE LATE EDWARD STABLER LEADBEATER)

When, in 1792, young Edward Stabler borrowed from an uncle a hundred pounds in order to buy stock for the apothecary shop he planned to operate, he did not realize he was establishing a business in which his descendants would continue for the next one hundred forty-one years Records do not tell us what feelings of uncertainty he may have harbored in relation to his venture, but they do show that his business prospered to such an extent that he was able to return the loan and double his stock of goods during the first year

The original bill, dated June 1792, came from Townsend Speakman of Philadelphia and contained about one hundred fifty items, amounting to 120 pounds,

[1] U S Stat at L 37, 416 (1912)

* Owned by the AMERICAN PHARMACEUTICAL ASSOCIATION

10 shillings and 6 pence, or, as was written underneath, 96 pounds, 2 shillings and 3 pence in Virginia currency Three of the items listed are still extant They are, two very heavy marble mortars and a quart flint glass bottle bearing the inscription "Spt Nitre" This bottle had been in constant use ever since the founding of the business, until 1933 when the doors were closed behind the last customer and the store ceased to function as a pharmacy

It is not surprising that during those earliest years of the store's history, General Washington, whose business and friendships often called him to Alexandria, frequently dropped in to talk with Edward Stabler and to purchase supplies to restock the medicine chest at Mount Vernon, where he had the welfare of his slaves as well as that of his immediate household to consider

That his widow continued the estate's dependence upon the Alexandria apothecary is attested by a note in her handwriting, dated "Mount Vernon, April 22nd, 1802" It reads

"Mrs Washington desires Mr Stabler will send by the bear'r, A quart bottle of his best Castor Oil and the bill for it"

An interesting entry in one of the old ledgers, under date of December 7, 1799, records the purchase by Dr Elisha Dick of one pound of Glauber Salts As this date was just eight days before General Washington's death and as Dr Dick was one of the physicians who attended him in his last illness, it seems very probable these salts were given the illustrious patient

Many letters and orders sent Edward Stabler from George Washington himself have unfortunately been lost, as these were given to various persons instead of being kept in the files of the business

There are, however, other documents that show the Washington family's connection with the store, one of which, from the General's nephew, Judge Bushrod Washington, who inherited the Mount Vernon estate, is as typical of a period when every second was not utilized at a break-neck pace, as are the candles, the lumbering coaches, and the powdered wigs that represent for us that adolescent period of America's growth Judge Washington wrote

"Respected Friend

"Above is a check for 77 9 amount of your account, which ought much sooner to have been attended to In future I will thank you to send it to me more frequently, at least once a year

' Respectfully,

"Bush Washington"

Also representative of a leisurely era is the correspondence between the good apothecary and the London firm of Allen & Howard In a letter written in 1801, Mr Stabler ordered

"One medicine chest, complete with weights, scales bolus knives, etc I want this to be of mahogany of good quality, as it is for the granddaughter of the widow of General Washington, the cost to be about twelve guineas"

It was not until the following year that Allen & Howard billed the apothecary for a "mahogany, folding door, medicine chest complete" at 11 pounds, 11 shillings, and shipped it on the sailing vessel Union, Thomas Woodhouse, master

A much less formal evidence of a long-continued friendship is found in the name, scrawled on the white plaster of one of the interior walls of the vault, of one

of the great-great nephews of the Father of His Country Several of this generation of the family owed their early business training to a boyhood connection with the store in which he traded Two of these nephews are now druggists in West Virginia

Over half a century passed between the days when the first president chatted with his Quaker friend, Edward Stabler, and those later days when, in his place, another great general frequented the little store to discuss national and local events with Edward Stabler Leadbeater, the grandson of the founder Here was another military man closely leagued with a peace-loving Friend However, the relationship seems not so paradoxical when one considers the gentleness, simplicity and sweetness of character of Robert Edward Lee

One of these tranquil talks, however, was fated to experience a momentous interruption A messenger, of whose identity as J E B Stuart, afterward Lee's chief of cavalry, contemporary records bear witness, entered the store with news of John Brown's raid Lee, still an officer in the United States army, was ordered to go at once to Harper's Ferry to quell the rebellion

"I am afraid," he said, "this is only the beginning of more serious trouble "

The correctness of his conjecture was evidenced all too soon and, before many months, Alexandria, a town whose sympathies were almost entirely with the South, was occupied by Union troops Husbands and sons marched away to fight for that which, after four bitter years was to become forever, "The Lost Cause "

A conquered town has, perhaps, more to tell in after years than has a besieged city, so that stories of those days in Alexandria are numerous, but the particular one that affects the Leadbeater drug store has to do with the unwillingness of the owner to take the oath of allegiance to the United States

Because his religious scruples forbade his joining the Southern army, Edward Stabler Leadbeater remained at his business when many of his neighbors marched off to the war Yet his sympathies were entirely with the South and he could not force himself to submit to the edict that, unless their clerks took the oath, all business houses should be closed However, Mr Lewis Mackenzie, a Union sympathizer and Justice of the Peace, declared he would trust no one but Ned Leadbeater to put up his prescriptions so, oath or no oath, the store must not be closed

Besides the Lees and Washingtons, another family of national importance, particularly through its marriages into the former two, the Custis family, also, dealt with the Stabler-Leadbeater firm

An interesting letter from George Washington Parke Custis has been preserved This letter, written, on April 8, 1818, reads

"My Dear Sir

"Not being able to command cash at this time from the heavy expense of my building, I enclose my note agreeable to promise I am duly sensible of the politeness and liberality I have always received from you and I have to express my acknowledgment also for the very excellent articles always received from your house and with perfect esteem for your personal character, I am, Your humble servant,

'George W P Custis "

It is interesting to note that the building in question was that of his dignified mansion, "Arlington," located on a hillside between Alexandria and the city of Washington and commanding an excellent view of the broad Potomac This

estate is now the well-known site of the national cemetery and has now, at some little distance from the Custis-Lee home, another structure of lasting beauty, the Arlington Amphitheatre, which furnishes a distinguished background for the tomb of the Unknown Soldier

In the period just before the Civil War, other noted persons were frequently seen in the old drug store

Mr Phineas Janney of Alexandria, a brother-in-law of Edward Stabler, was famous for his excellent table And not only were the viands spread upon it extraordinarily fine, but the company that sat about it was unusually brilliant It numbered often John Calhoun, Henry Clay and that illustrious son of New Hampshire and of Dartmouth College, Daniel Webster, as well as other notables of the day

After one of these dinners, these gentlemen had often to wait several hours till such time as they might take the ferry boat back to Washington It was their custom to repair to Friend Stabler's, where they sat about and discussed burning issues of national importance or, possibly, those trivialities to which even the great occasionally condescend

Among the interesting documents preserved since the early days of the business is one which, although it relates to no persons of particular eminence, may well be referred to as an eloquent testimonial to two "great" rascals, as well as providing an interesting glimpse of an unusual method of closing an account

This entry, under date of 1797, follows

"Clingman and McGaw To repairing medicine chest for ship Saratoga, 2 pounds, 5 shilling, 6 pence

"Credit by dishonesty in full which in the ultimatum met with its full reward (as vice always does), McGaw being executed in Scotland for being as a spy on board of a French ship—Clingman being arrested in Holland—what became of him I know not"

A brief description of other items of interest in relation to the store should add to the visitor's pleasure in viewing this little-changed business place of bygone years

At the rear of the 107 S Fairfax St section of the store is a large desk, the front of which has been fitted with two compartments in which are mirrors, one of them bearing in gold leaf the figures "1792" and the other "1892," thus symbolizing a century of service

Above these mirrors, in letters of gold leaf on a dark background are the various names under which the business was operated up till 1865 They are

1792
Edward Stabler
1820
E Stabler & Son
1831
William Stabler
1840
William Stabler & Co
1844
W Stabler & Bro
1852
John Leadbeater
1857
J Leadbeater & Son
1860
Leadbeater & Co

To bring the record up-to-date, the following firm names should be added

1865
E S Leadbeater & Co
1869
E S Leadbeater & Bro
1892
E S Leadbeater & Sons
1903
E S Leadbeater & Sons, Inc
1916
Leadbeater Drug Corporation

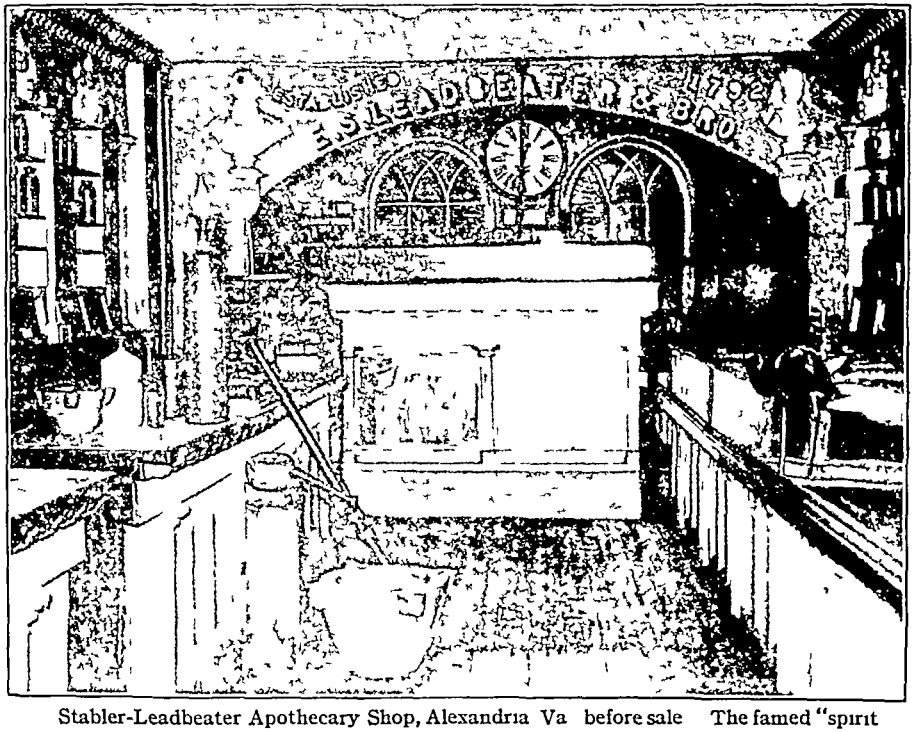
Over the desk are plaster casts of General Washington's head on the one side and on the other, Benjamin Franklin's A little boy, asked whom they represented, replied

"Why, George and Martha Washington, of course!"

Accuracy was, perhaps, to his mind less essential than appropriateness

In honor of the other general associated with the store, there hangs over one of the doorways in this same room a large picture of Robert Edward Lee and the generals on his staff

In this room, too, is a large clock, well over a hundred years old



Stabler-Leadbeater Apothecary Shop, Alexandria Va before sale The famed "spirit of nitre bottle" is on the counter, back of a mortar, also a tall show bottle On the front counter, at the left, is the General Robert E Lee plate

Old hand-blown bottles, the ancient show cases, the shelves covered with gleaming bottles of ingredients for prescriptions as well as the various staples sold by apothecaries for many, many years, all serve to heighten the contrast between this historic business house and a modern drug store where one has almost to constitute oneself a hunting party in order to find medicinal supplies In these and in the old ledgers the casual visitor, as well as the carefully trained pharmacist, will find much of interest and will feel amply repaid for the time spent in a visit to the store, for such a visit constitutes a fascinating and delightful excursion into the nation's past

EDITOR'S NOTE The exterior and interior of the building are now being restored and will be kept open as a museum when restoration is completed, a memorial to its founder and a reminder of early American pharmacy and illustrious patrons of this pharmacy See pages 705–707, JOURNAL A PH A for August 1933

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

Perhaps no subject taught in colleges of pharmacy has changed as much in the past decade as has the subject of chemistry, especially organic chemistry This explains the amount of time, attention and thought that has been given to this subject in the meeting of our teachers' conferences The importance of it cannot be overemphasized The papers by Dr Jenkins and Professor Harrod are worthy of careful study by all teachers of organic pharmaceutical chemistry—C B JORDAN, *Editor*

TEACHING ORGANIC PHARMACEUTICAL CHEMISTRY

BY GLENN L JENKINS *

NEED FOR MORE EMPHASIS

The changing trend in Materia Medica has resulted, in many instances, in the partial or complete replacement of many natural drugs by pure chemicals This tendency toward the more extensive use of pure chemicals, whether they are isolated from natural sources or made synthetically, has placed an ever increasing responsibility and amount of subject matter upon those who teach chemistry in colleges of pharmacy The burden falls especially to the lot of those who teach organic chemistry Sufficient cognizance of the change that has occurred and is occurring has not been made in formulating new curricula A casual perusal of the latest edition of The Pharmaceutical Syllabus and of The Prescription Ingredient Survey by Gathercoal furnishes evidence of this fact In the Pharmaceutical Syllabus under the outline of the required course in pharmacognosy is written, "The course should include every crude vegetable or animal drug that the pharmacist is likely to be called upon to sell or dispense The order of emphasis should be determined by the order of importance and the order of importance should be determined by usefulness and extent of use by pharmacists, physicians and laity" A primary list of drugs to be studied in detail as well as a secondary list of drugs to be studied less thoroughly is appended The primary list includes such drugs as *Apocynum, Chirata, Matricaria, Pepo* and *Xanthoxylum* The secondary list includes such drugs as *Absinthium, Adonis, Aletris, Aralia, Berberis, Geranium, Juglans, Mezereum, Rumex, Sassafras Pith, Trifolium, Triticum* and a host of others The Prescription Ingredient Survey shows that these drugs and their preparations are seldom if ever used in prescriptions

The only required course of instruction treating of organic chemicals in The Syllabus is the basic course in Organic Chemistry, a course that should be restricted in scope to the teaching of the fundamentals of organic chemistry, theory and practice It should be obvious that this elementary course is not given sufficient time in the average curriculum to cover both the fundamentals of organic chemistry and the chemistry of the many complex and diverse types of organic chemicals used as medicaments The irrationality of the situation is augmented when the importance and extent of use of such chemicals as the alkaloids, volatile

* School of Pharmacy, University of Maryland, Baltimore, Md

oil derivatives, hypnotics, anesthetics, antiseptics, etc, are considered The condition that pertains in many schools can be corrected in large measure by the introduction of a required course in organic pharmaceutical chemistry

SCOPE OF THE COURSE

The scope of a course in pharmaceutical organic chemistry should include natural as well as synthetic products Those chemicals described in the United States Pharmacopœia, National Formulary and New and Nonofficial Remedies should be made the chief subject content of the course It should not be restricted to them since many new remedies not included in these volumes, due to patent rights or other cause, are of equal and sometimes of greater importance The emphasis given to any phase of instruction must necessarily be determined by the individual teacher The formulation of any definite course content should be based on and correlated with that of the pre-requisite and other courses Frequent revision of the subject matter should be made by adding new remedies as they are introduced into therapeutic practice To do this, the teacher must continually survey the journal literature

DIDACTIC INSTRUCTION

The classroom teaching of organic pharmaceutical chemistry need not differ from or require a different method of presentation than that employed in teaching elementary organic chemistry The difference should be chiefly one of emphasis Thus, where fundamental theory and the reactions of functional groups in simple compounds are studied in the pre-requisite course, the applied course is limited primarily to a study of the reactions involved in the production, purification and identification of medicinal compounds The compounds may be classified into characteristic groups according to therapeutic usage or according to chemical structure for the purpose of systematic study The classification according to therapeutic use, *i e*, as anesthetics, hypnotics, antipyretics, antiseptics, etc, is of value if one primarily wishes to bring out chemo-therapeutic relationships It may be of special value if a thorough course in pharmacology and therapeutics is not included in the curriculum This method of approach to the subject has the disadvantage that widely varying structures are grouped together Thus different classes of chemical compounds, such as alcohols, aldehydes, ketones, disulphones, esters, amides and urea derivatives would be considered in a single group under sedatives and hypnotics Generalizations pertaining to methods of synthesis and isolation, reactions and properties are often impossible when this method is utilized When a systematic chemical classification is followed in presenting the subject matter, compounds of related structure and, in many cases, of widely variant therapeutic use are grouped together This system serves to emphasize the many instances of absence of relationship between structure and physiological activity which are much more common and striking than the cases of chemotherapeutic relationships The chemical classification has the further advantage that compounds of related structure, isolated or synthesized by a general method, and having properties in common are considered at the same time

It has been my experience that the presentation of the subject matter from the chemical viewpoint is best Synthetic products can then be discussed along

with natural products to which they are related and derivatives of natural products are placed beside the parent substances Since students are partially familiar with the chemical system of classification, they are enabled to draw upon and utilize knowledge gained in the elementary course It makes unnecessary a detailed study of each compound, *e g*, the methods of synthesis and the properties of most of the barbiturates can be obtained from a detailed study of barbital

Since no suitable text is available, the subject must be taken up in lectures or discussional groups or both An abundance of reference works in English on such subjects as alkaloids, fats and waxes, volatile oils, enzymes, natural and synthetic medicaments, etc, are available, however These and review articles in the journals can be used for collateral reading Regular weekly assignments including specific questions that are to be studied and answered by the students have proved of value Topic assignments which demand collateral reading also can be made advantageously

LABORATORY INSTRUCTION

Laboratory instruction is difficult to carry out when dealing with complex compounds Experiments that require chain synthesis are better suited to the graduate than to the undergraduate laboratory Simple experiments which are adaptable to performance often do not illustrate new reactions or require different technique from that used in the basic course A valuable laboratory course of instruction can be built up without elaborate or expensive facilities, however Thus experiments having for their object the isolation of enzymes, alkaloids, volatile oils, glycosides, etc, and a study of the purity and identity of the products obtained are practicable The laboratory work on complex synthetic remedies can be limited to qualitative tests for identity and purity If small amounts of the chemicals and reagents are used, a twofold objective may be attained, namely economy of materials and perfection of technique From this type of work the student gains a feeling of intimacy with the materials handled and experiences in some measure the spirit of the thought expressed in an editorial in the *Journal of Chemical Education* "By all means let us encourage a student to experience his own romance of science—an acquaintance with Dante and Beatrice will do him good but it will be neither so illuminating nor so satisfying as an affair of his own"

CONCLUSION

Rapid strides forward have been made in pharmaceutical education through the extension of the course of instruction to a minimum of four years The next forward stride should consist of a further realignment of the content of the courses of instruction In that realignment, more complete recognition of the changing trend in therapeutics should be made The increasing importance of natural and synthetic organic chemicals should be acknowledged through the inclusion of required courses in organic pharmaceutical chemistry in the curricula If the necessary time for the inclusion of this instruction cannot be found, it may be necessary to delete much teaching concerning therapeutically dead substances, the epitaphs of many of which are written in our official standards and dispensatories to make way for the new generation of used products

TEACHING ORGANIC CHEMISTRY TO PHARMACY STUDENTS

BY J R HARROD *

INTRODUCTION

Since the dawn of history, man has been interested in his own physical welfare—health, comfort and appearance He has consequently discovered and invented remedies, sedatives and cosmetics, first empirically and then scientifically Pharmacy and chemistry were one, finally, chemistry, because of many other applications, developed into a distinct and separate branch of science, but the close relationship still exists Serving to reveal physiological functionings, both regular and irregular, and to develop means by which useful medicinal compounds may be prepared from natural sources or synthesized from the elements—organic chemistry is a fundamental factor in the pharmacist's professional education

THE AIM IN TEACHING THE COURSE

The primary purpose in offering any course of study to a student is to assist him in gaining a working knowledge of its facts and fundamental principles It is desirable to organize the material of the course so that the student's time may be reasonably conserved and that he may be enabled to acquire the knowledge without confusion and bewilderment Organic Chemistry being a highly specialized branch of science, is usually taught, not as a part of general information or cultural education—although this may be done—but as an important component of the technical preparation for life's vocation

In the university, where students of many different motives are working, the question often arises as to whether they should be segregated according to their respective interests and each group offered a course in organic chemistry peculiarly adapted to its particular viewpoint, or whether all should be offered the same course It is the opinion of the writer that there are many advantages to be realized from requiring all students, regardless of their ultimate interests to carry on the same basic course, and that these advantages outweigh the disadvantages that may arise from such procedure In the first place it is thought that any student of science should see it in perspective as a great relationship of various types of compounds, should see it in relation to other branches of science as inorganic chemistry, physics and biology, should see it in its relation to the solution of human problems such as those found in the practice of pharmacy, the practice of medicine and the operations of industry and agriculture It is believed, moreover, that the student being made acquainted with the application of organic chemistry in these various fields will have created in his mind a keen desire to make use of it in the solutions of the specific problem found in such technical courses as pharmacology, pharmacognosy, urinalysis and physiological chemistry By this means the student will be directed to observe and offer his own solution to a given problem rather than have these items pointed out and suggested by his instructor

Furthermore it is believed that the student should be led to see that in whatever vocation or profession he finally orients himself, his part of the world's work will always be definitely related to all other parts, and that unless he takes this fact

*Ohio Northern University, Ada O

into consideration he cannot expect maximum success He cannot afford to assume a snobbish attitude toward any other profession or to become clannish in his habits It is not presumed here that the course in organic chemistry shall be transformed into a course in sociology or social relations, but the atmosphere of the general course may be made to impart these ideas without in any way impairing its efficiency to teach chemistry

THE CONTENT OF THE COURSE

The choice of material for any course of study is an important problem At least two considerations must be made, (1) material that will give the desired factual information must be chosen, (2) material that will illustrate the right method of attack will be required

It is conventional to classify organic compounds as hydrocarbons, halogen derivatives, alcohols, aldehydes, ketones, acids, etc, and this classification is usually followed in the teaching process Because of the great wealth of information presented in the average textbook, a definite study program including a systematic arrangement of facts pertaining to the respective groups, together with methods of synthesis by which compounds of one group may be prepared from appropriate compounds of other groups, is indispensable to the student This study program will logically include

1 *Occurrence* The compounds of the given group may be only laboratory products or may be found in nature, or both

2 *Preparation* A study is made of the reactions whereby the compounds may be prepared from the natural sources or by synthetic means

3 *Properties* Both physical and chemical properties are classified and then, later, expressed for the most part by means of equations

4 *Structure* The relationships of the various types of compounds are established by studying the structures of the molecules and the groupings found therein, and by studying the reaction whereby these structures may be proved

5 *Isomerism* The student on his first acquaintance with organic chemistry is puzzled to know how such an enormous number of compounds can arise from so few elements He soon learns that a given empirical formula may represent a dozen, twenty, a hundred or almost any number of compounds, and that this is true because the atoms may be arranged in great variety within the molecule

6 *Nomenclature* When one first reads the literature of organic chemistry, he is surprised by the endless confusion of names The variety of systems and the lack of system is sometimes bewildering even to the experienced chemist, while for the beginning student it may become a matter of utter discouragement A careful consideration of this topic is imperative

7 *Representative Compounds* It is shown that because of homologous relationship a detailed study of one or two compounds of a group will be sufficient to establish the general properties of that group

8 *Medicinal Compounds* In the respective groups at appropriate points a few medicinal compounds are studied, and whenever possible one of these may be used as a type compound, thus lending interest and utility to the course

9 *Commercial Compounds* In the same manner commercial compounds that have general application are introduced

This definite program is applied to each major subdivision of the science in skeleton form until the student has the perspective and then in considerable detail For the latter he is required to read his textbook Thus it is found possible to interest and accommodate the various types of students—pharmacy, pre medical,

engineering, arts majors—and at the same time be so specific that each student will find sufficient reference to his particular field that he may readily make application in his respective technical courses

METHOD OF PRESENTATION

College students are generally interested in personal achievement The facts and principles of chemistry become particularly attractive when associated with the individuals who are responsible for their discovery and development Dalton, Lavoisier, Berzelius, Dumas, Liebig, Wohler, Kekule and Faraday were real human men, possessing the emotions, passions, virtues and vices that are found in mankind generally To know of them, as well as many others, and their work lends incentive to the study of chemistry

This science took on a new perspective when Liebig and Wohler discovered that cyanates and fulminates might contain the same elements in the same proportion When Wohler found that he could prepare a compound, that he had always supposed was made only by life processes, from a common inorganic compound that in turn could easily be prepared from the elements, a revolution was achieved

The reasonings and controversies of these great pioneers of chemistry lend interest to isomerism, and the sympathy, humanity, kindness and industry of Pasteur give attraction to optical rotation Kekule's dream of wriggling molecules fixes indelibly the structure of benzene, and the perseverance of Erlich lends enchantment to organic synthesis, while Fischer's superb work adds dignity and fascination to research

Too often organic syntheses are just so many chemical reactions that must be committed to memory so as to be able to pass the examination Malonic ester may mean starting with chloroacetic acid and winding up with the sour, foul-smelling constituent of rancid butter, or, it may mean the preparation of the beneficent compounds of barbital, luminal and amytal If so, there is no trouble to remember it The synthesis of acids is not in itself a particularly attractive topic, but when Kolbe's synthesis is applied to salicylic acid, attention is obtained immediately Sulpho ethers sound like far-fetched and foreign compounds, but when a substituted one in the form of mustard gas is discovered they take on new significance, and the topic of sulphones becomes a surprise of interest when one comes across sulphonal The diazo reaction also becomes interesting when it is found to be used in the preparation of such common compounds as methyl orange and methyl red The significance of phthaleins becomes apparent when phenolphthalein, fluoroescein, eosin and mercurochrome are mentioned

CONCLUSION

This, in briefest outline, is the plan of the course in organic chemistry offered to a mixed group of students at Ohio Northern University It is the writer's experience that interest is aroused and maintained, and that the student, who satisfactorily completes the course succeeds well in his chosen field, be it pharmacy, medicine, teaching, industrial work or graduate study At the same time those who have followed the course for general information are enabled to see how the science contributes to the development of human welfare

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary, 2215 Constitution Ave Washington, D C

LETTER NO 6

October 16, 1934

To the Members of the Council

31 Joint Meeting Executive Committee, N A R D, and Council, A Ph A The annual joint meeting was held in New Orleans on September 24th The following is the report as issued by Secretary Dargavel and Secretary Kelly

"The annual meeting of the executive bodies of the A PH A and the N A R D was held on Monday, September 24th, in the conference room H of the Roosevelt Hotel, at 9 30 A M, at which the following members were present National Association of Retail Druggists—Harvey A Henry, Chairman of the Executive Committee Monte L Powell, President George L Secord, Thomas S Smith, C Fred Wright Charles Ehlers, John Witty, John W Dargavel

"Members of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION—E F Kelly, W Bruce Philip, Walter D Adams, James H Beal

These meetings are held for the purpose of discussing many problems of mutual interest to the two groups

"The program included consideration of the various suggestions recently advanced for a consolidation or a closer coordination between the two associations, and for a closer affiliation between them and the state associations, food and drug legislation, U S P and N F Publicity and National Pharmacy Week

Secretary Kelly was called upon to open the discussion of the first subject and spoke at length of the conditions which led to the organization of the N A R D and the relations which had existed between the two organizations He assured the officers and members of the N A R D that it is the purpose and desire of the A PH A to at all times work with them on all problems of mutual concern

"Attention was called to suggestions from time to time for consolidating the associations and for a more effective alliance between them The A PH A has always been willing to consider such suggestions in good faith as shown by the resolution adopted by it last year So far no acceptable plan has been submitted for consolidation because of the sharply different field in which the associations operate and any move in this direction should have very careful examination

Recent developments and proposals however warrant further consideration of the whole subject of the relations between the associations and between them and the state associations to the end that the need of all three groups may be fully met A close affiliation or coordination of the two associations with the supporting state and local associations was urged Dr Secord spoke in support of Dr Kelly's remarks

"Dr Beal also addressed the group He also was in accord with the statements previously made and stated that he was to address the convention on this subject at which time he would detail the reasons why in his opinion actual consolidation of the associations was impossible

"Practically all of those present were called upon and expressed the opinions that the two associations having so much in common would work in harmony

'Food and drug legislation was next discussed It was the concensus of opinion that the two associations should take an active part in initiating and supporting such legislation

W Bruce Philip, Counsel of the N A R D brought out the fact that he had written a Food and Drug Bill in the form of an amendment to the present act

'It was agreed that at the coming annual meeting of the National Drug Trade Conference, the A PH A and the N A R D should actively coöperate to secure the approval of a satisfactory bill for submission to Congress

"A general discussion of National Pharmacy Week and the U S P and N F Publicity and of plans for promoting these movements followed

'Inasmuch as the A PH A in its meeting at Madison had passed a resolution to the effect that a committee be appointed to meet with a committee of the N A R D if the latter approved for the purpose of affecting a better relation between the two organizations, the Executive Committee present offered a motion which was seconded and passed that the President of the N A R D appoint a like committee to confer with the Committee from the A PH A

'The motion was as follows

"That a committee of three be appointed to work with the A PH A committee to consider the relations existing between the two associations and to present at the earliest opportunity a plan or suggestions for improving them

"The committee is also to consider matters relating to the Drug Trade Conference to Pharmacy Week and the U S P and N F Propaganda and will meet at an early date It was agreed that all matters pertaining to present publicity concerning this meeting or any meetings between the N A R D and the A PH A should emanate from the Secretary of the N A R D or from the Secretary of the A PH A

'There being no further business before the committee it was adjourned"

The subjects considered were limited as noted to those mentioned on the program recently submitted to the members of the Council

Messrs Rowland Jones and Oscar Rennebohm were present at New Orleans, but arrived too late to attend the joint meeting

Among the resolutions adopted by the N A R D was one disapproving the proposed consolidation of the two associations

In accordance with the resolution as adopted at the Madison meeting in 1933 Chairman Hilton of the Council has appointed E F Kelly, R P Fischelis and R L Swain

At the joint meeting in New Orleans, it was agreed that if the State Associations requested representation on the joint committee, this would be provided

(*Motion No 5*) *It is moved by Eberle that the appointment of Messrs Kelly Fischelis and Swain to represent the A Ph A on the joint committee by Chairman Hilton, be approved*

32 Committee on Maintenance The following letter has been received from Chairman Dunning of the Committee on Maintenance

The recent campaign for funds to free the American Institute of Pharmacy Building from debt has resulted in aggregate subscriptions amounting to $119,314 00, $50 000 00 of which represents a bequest, leaving a difference of $69 314 00, $58 228 00 has been paid in cash, the balance credited to the AMERICAN PHARMACEUTICAL ASSOCIATION Headquarters Building Fund, in the Maryland Trust Company, is $51 184 18 The current bills amount to less than $3000 00 and a few hundred dollars in addition, will take care of all unforseen expenses within the immediate future When all these bills and expenses are paid there will remain a balance of approximately $48 184 18

"There is, therefore, at the present time in hand sufficient funds to meet current bills pay off the $40,000 00 note held by the Maryland Trust Company and leave a balance of approximately $8000 00 in cash The instalment payments will, of course increase this cash as time goes on as also will new subscriptions, which are being received regularly in small numbers

'The only other obligation against the American Institute of Pharmacy project is a mortgage of $36 000 00 held by the George Washington University on account of the lot in the rear which we were obliged to purchase to be able to obtain the necessary frontage for our building This mortgage could be reduced from time to time, could be paid off out of the new subscriptions which will come in over a period of years or, if such funds would be insufficient then the payment of $50,000 00 bequest already mentioned, would eventually take care of this debt and leave a balance

It is evident that the American Institute of Pharmacy project, including the building, the equipment furnishings, land and every other cost is free from financial obligations and is at present secure and safe

"The operating expenses of the AMERICAN PHARMACEUTICAL ASSOCIATION in this building are, as you have been informed, through my open letter to pharmacists, not greatly more than the moderate amount expended upon the quarters which were occupied in Baltimore

"I think it is quite correct to say that the project is, at present, on a sound financial basis and does not represent, in any sense, a threat to the security and safety of the future of the AMERICAN PHARMACEUTICAL ASSOCIATION, but, on the contrary, does provide obvious advantages

"It seems to me advisable to remind the Council that an Act of Congress provides that the American Institute of Pharmacy Building and its occupant, or occupants, must operate on a non profit basis, also that freedom from revenue taxes and, more particularly, from property taxes in the District of Columbia, is dependent upon meeting the requirement before mentioned Just recently, the Daughters of the American Revolution have been subjected to an investigation on account of renting some portion of their Continental Hall Building for profit and have been threatened with taxation

"I am suggesting to the Council that Secretary E F Kelly, Treasurer C W Holton and myself be authorized to reduce the note held by the Maryland Trust Company, or pay it off in full at any time within the next ninety days from the present date, in accordance with our best judgment"

H A B DUNNING, *Chairman*

(*Motion No 6*) *It is moved by Philip that E F Kelly Secretary, C W Holton Treasurer, and H A B Dunning, Chairman, be authorized to reduce the note held by the Maryland Trust Company, or pay it off in full at any time within the next ninety days from the present date, in accordance with their best judgment*

33 Local Secretary for 1934–1935 No nominations have been submitted other than that of Dean Mickelsen (see Council Letter No 4, page 945)

(*Motion No 7*) *It is moved by Kelly that A O Mickelsen, Portland, Oregon, be elected Local Secretary for 1934–1935*

34 Headquarters and Time for 1935 Meeting Certain recent developments in connection with the joint meeting of the Oregon, Washington and Idaho Pharmaceutical Associations, to be held in Portland during the week of the A PH A meeting, make it necessary to further delay the vote on the headquarters hotel and the time (see Council Letter No 4, pages 945–946) It is important, however, to elect the Local Secretary in order that the necessary committees may be appointed and the plans for the meeting be prepared

35 Use of Text of the N F V The following communication has been received from Chairman DuMez of the Committee on Publications

"I have gone over the manuscript submitted by G S Eadie of the School of Medicine of Duke University, which we propose to use in the Hospital Formulary of Duke Hospital, and find that he has used the text of the National Formulary no differently than others to whom we have granted permission to use portions of the text of the N F in the publication of books I am, therefore recommending to the Council that permission be granted to G S Eadie to use portions of the text of the National Formulary in the preparation of the Hospital Formulary of Duke Hospital, and that no charge be made therefor in view of the small amount of material taken from the N F and the restricted use to which the publication will be put"

(*Motion No 8*) *It is moved by DuMez that permission be granted to the School of Medicine of Duke University to use the text of the N F VI for partial reproduction in the Hospital Formulary of Duke University under the usual conditions and that no charge be made therefor in this instance*

36 Applicants for Membership The following applications properly endorsed and accompanied by the first year's dues have been received

No 42, David A Lofgren, 30 E 111th St, Chicago Ill, No 43, John David Smith 101 Manly, Univ of N C, Chapel Hill N C, No 44 Bernard J O Connell 17515 Parkside, Detroit, Mich, No 45 W L Hickok, Martinsville Va, No 46 Ray M Bush, 770 Angella St, Dubuque, Iowa, No 47, Paul Leopold Weinbrenn, 24 Rosebank Rd, Johannesburg South

Africa, No 48, Tzee Hugh Chung, 283 Des Voeux Road, Hong Kong, China No 49 Edward J Byard 617 Spruce Street Morgantown, W Va , No 50, Wen-Yuan Chen The Golden Sea Library, Tangku, N China, No 51, Walter L Sechrist, 4209 Chester Ave , Philadelphia, Pa , No 52, John T Cummins, 1660 Neil Ave , Columbus, Ohio, No 53, Chas H Sprague, 6103 Military Ave , Omaha, Nebr , No 54 Lew Wallace 745 Sixth Avenue, Laurel Miss , No 55 William Wood, 1801 S Sixth St , Philadelphia, Pa , No 56, George Allen Emmart, 6011—4th St , N W , Washington, D C , No 57 Ralph King Miley, 418 W M Bay St , Tampa, Fla No 58, Frank Joseph Mayer, 3213 W 56th St Cleveland, Ohio, No 59 Wesley Dalton Owens Pleasant St and University Ave , Gainesville Fla , No 60 Joseph Wilensky, 1943 66th St , Brooklyn, N Y C , No 61, William Donald Nelson 2029 W Broadway Minneapolis, Minn No 62, Roger S Carlson, Union Park Hotel, Chicago, Ill , No 63, Arnold Lawson, 193 Baltimore Blvd , Brentwood Md , No 64, Alfred Rigling 20th St and Parkway, Philadelphia Penna No 65, Coleman Bardos, Jr 55 West 16th St , New York N Y , No 66, John Richard Nishanian, 2008 LaFontaine Ave , New York N Y , No 67, Norman Kenneth Edgars, 85 Hillside Ave , Tenafly, N J , No 68, George Kenneth Thompson, 251 Center Ave , Elizabeth, Penna , No 69, Nathan Alexander Simpson 295 West Essex Ave Lansdowne, Pa , No 70, Arthur Schuck, 423 N Lake St , Madison Wis , No 71, Casimir Zielinski 3141 S Logan Ave Milwaukee Wis , No 72 Louis A Marzolini, 308 East 105th St Manhattan, N Y , No 73 William R H Breuer, 775 Woodward Ave , Brooklyn, N Y , No 74 Abraham Schwartz, 1541 Shakespeare Ave , Bronx, N Y C , No 75, Ernest William Bye, 704 Kansas Ave Topeka, Kansas, No 76, Philip Lemchen Route No 2, Box 73V, New Brunswick N J

(*Motion No 9*) *Vote on applications for membership in the American Pharmaceutical Association*

E F KELLY *Secretary*

EASTERN GROUP PLANS STABILIZATION CONTROL

To seek a reasonable margin of profit between costs and suggested minimum selling price, and to creat a more closely ' supervised" price stabilization program than has ever before been possible, will be the first steps taken by the newly formed federation of Eastern States pharmaceutical associations to test its power in dealing with drug problems according to John F O'Brien executive secretary of the new group and president of the New York State Pharmaceutical Association

The new federation which consists of delegates from nine eastern state associations and may include three others was formed for the professed purpose "of promoting professional and economic interests of pharmacy and to cooperate with the AMERICAN PHARMACEUTICAL ASSOCIATION and National Association of Retail Druggists in matters of national importance "

In addition to its price stabilization activities Mr O'Brien said that the new group will also work for the reconsideration by manufacturers of their present policy on ten-cent sizes, for the restoration of discounts formerly allowed by wholesalers and for legislation which will confine the sale of medical products to pharmacies

Although the policies of the new federation have not been definitely worked out as yet, the executive committee of the group has been appointed and will meet shortly to develop its processes of operation The executive group according to the by-laws of the association, is authorized to deal with any and all problems of professional and economic importance

The federation plans to hold semi annual meetings in May and November, at which time the members of the council of the federation will meet Each state has already appointed its representative, which consists of two members, one appointed for a two-year term and the other for a one year term The councilors are selected by state pharmaceutical associations of the states represented Those states are Massachusetts Rhode Island Connecticut, New York New Jersey, Pennsylvania Maryland, Virginia, West Virginia It is also believed that New Hampshire, Vermont and Maine will become affiliated with the federation —*From Drug Topics*

TEXAS PHARMACEUTICAL ASSOCIATION

Dallas was selected as the convention city in 1935 by the executive committee of the Texas Pharmaceutical Association at its semi-annual session at the Adolphus Hotel The Convention will be either in May or June

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of t Association with the understanding that they are not to be published in any other publicati prior to their publication in those of the Association, except with the consent of the Council —Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Associ tion shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts local branches shall in no way commit or bind this Association, and can only serve as recommendation to it* And no local branch shall enact any article of Constitution or By-Law to conflict with th Constitution or By-Laws of this Association "

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues pai members of the Association, holding not less than six meetings annually with an attendance o not less than 9 members at each meeting, and the proceedings of which shall have been submitte to the JOURNAL for publication, may elect one representative to the House of Delegates "

Reports of the meeting of the Local Branches shall be mailed to the Editor on the da following the meeting, if possible Minutes should be typewritten with wide spaces between th lines Care should be taken to give proper names correctly and manuscript should be signed b the reporter

BALTIMORE

The regular monthly meeting of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on November 8th, at the Emerson Hotel The meeting was prefaced by a delightful dinner given in honor of Dr and Mrs R P Fischelis by the Faculty of the School of Pharmacy of the University of Maryland The dinner was attended by members of the Faculty of the School, by Maryland State Department of Health officials, by officers of the Maryland Pharmaceutical Association, Baltimore Retail Druggists' Association, Baltimore Veteran Druggists' Association and by members of the Baltimore Branch

The meeting was called to order by President B Olive Cole at 8 15 who presented the speaker of the evening Dr Fischelis spoke on, "Federal Regulation of the Drug Industry " During the course of his address Dr Fischelis discussed the following

The direct responsibility of the AMERICAN PHARMACEUTICAL ASSOCIATION in improving drug legislation and the relation of the ASSOCIATION to the fostering of better drug standards, the view of the non medical members of the Committee on the Costs of Medical Care regarding the distribution of information on public health matters through pharmacies, several new trends in advertising control in the drug industry, formula disclosure, the variation limits of the U S P and the N F and their relation to modified formulas, a proposed board of review to be appointed by the President to pass on rulings of the Department of Agriculture, what constitutes medical opinion, finally, how the A PH A should sponsor good food and drug legislation

Dr Fischelis said he believed that enforcement officials should have enough power to put into effect the spirit of the public health law and that they should not be hampered in their work by drastic provisions that might open ways in which unscrupulous individuals could circumvent the good spirit of the law

The speaker further pointed out that anyone who is desirous of medicating himself should have the right of knowing what he is taking He said he was convinced that qualitative formula disclosure for proprietary remedies was in the best interest of the public welfare

At the conclusion of the address the meeting was opened for discussion Dr A G DuMez A L Sullivan of the Maryland State Department of Health, Dr John C Krantz, Jr , Simon Solomon, Dr R L Swain, Dr E F Kelly and others present discussed various points brought out by the speaker

A rising vote of thanks was tendered to Dr Fischelis for coming to Baltimore and presenting his address The meeting was well attended, including several guests from Washington and students of the School of Pharmacy

C JELLEFF CARR, *Secretary Treasurer*

CHICAGO

The 223rd meeting of the Chicago Branch of the A PH A was held Tuesday evening October 16, 1934, at the University of Illinois College of Pharmacy

President Webster called the first meeting of the school year to order and introduced the

first speaker of the evening, Prof R E Terry, who gave a report of the AMERICAN PHARMACEUTICAL ASSOCIATION meeting held at Washington D C, last May This meeting of the ASSOCIATION was in conjunction with the dedication of the new building erected in Washington by the ASSOCIATION

The second speaker of the evening was Prof E N Gathercoal chairman of the Revision Committee of the National Formulary He outlined the progress of the revision as of January 31, 1934 There will be very few changes in items after that stage of revision

A summary of the report shows the following statistics The N F VI will contain 714 items, N F V items carried over will number 482, deleted U S P X items will number 79, 153 new items not found in either the U S P X or N F V, will be added Most of these additions and deletions were suggested by the prescription survey conducted for the purpose of ascertaining their extent of use

The arrangement of the book will differ in that it will consist of only one part and not divided into separate parts as in the previous revision The style of arrangement will be as follows Title Page Preface, General Principles, Individual Monographs alphabetically arranged, Diagnostic Reagents and Clinical Tests Standards for Materials and Processes Used in N F Tests and Assays, History, Index Supplements

Twenty new ampuls will be added twenty two new chemicals six glandular products and fifty four new tablets, not to mention small numbers of the many other classes of preparations

Some innovations in standardization of biological products will be found in the new book

After many questions had been answered by Professor Gathercoal the thoroughly enjoyable and educational meeting was brought to a close by President Webster

L TEMPLETON *Secretary*

DETROIT

Members of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION recently adopted a plan for permitting customers to pay for medical service and medicines in 15 monthly instalments The chairman of the committee is Leonard A Seltzer, Don Squier and Ben Bialk are members of the committee and K B Reed is the manager of the Medical Service Bureau

NEW YORK

The October meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the College of Pharmacy Columbia University on Monday October 8th About forty-five members and guests attended

President Ballard was in charge of the meeting which was opened by the reading of the minutes of the May meeting The minutes were accepted as read

Treasurer Currens reported This report was accepted

The applications for membership in the A PH A together with remittances of Messrs Breuer and Schwartz were received for forwarding by the secretary

Chairman Lehman, of the Committee on Legislation and Education, reported that the police were arresting pharmacists for the sale of emmenagogues and contraceptives He also mentioned that it was now illegal to sell valerian or its preparations except on a written prescription The labor difficulties in the Bronx between store owners and the Drug Clerks Union were briefly discussed

Dr Arny moved that a committee be appointed to draw up suitable resolutions concerning the work and contributions to pharmacy of our dear departed friend Dr Kassner, the resolutions to be sent to Mrs Kassner This motion was approved and President Ballard made the appointments after the meeting

The chairman then announced the programs already arranged for several meetings in advance and urged every one to attend He called attention to the fact that the December meeting would be held in the Brooklyn College of Pharmacy through the invitation of the Kings County Pharmaceutical Society

The guest speakers for the evening were then introduced The first was Fred L Wertz who discussed, "Advertising in Pharmacy"

Mr Wertz began by pointing out that he as a layman, had only learned of Pharmacy Week in the last two years He emphasized that pharmacists were not impressing the public with dignity and respectability of their profession and that National Pharmacy Week required the whole hearted cooperation of every pharmacist in order to make the public fully conscious of it In this connection his argument was that pharmacists should take greater interest in the advertising value of

their show windows, and the cases and general fixtures within the store

Mr Wertz was particularly desirous to impress his listeners with the thought that the windows were a source of attraction in bringing people into the store Good salesmen cannot function unless people come in to buy and look around The speaker called attention to the error made by many pharmacists of failing to tie up their window displays with national advertisers

Many interesting examples were cited by the speaker and some enlightening figures on the sums spent by department stores for window displays were given

In summing up, Mr Wertz declared that window advertising was the least understood form of advertising, the most neglected, and was the one form which provided the small retailers with the most favorable opportunities

At the close of the address, Mr Currens said that the retailer should back up what he puts in his window

Fred Frankfurter, retail pharmacist, then spoke on, "The Return to Pharmacy"

Pointing out that many factors were involved in assigning causes for the present unsettled conditions in retail pharmacy, he briefly reviewed some of the work being done in Westchester County to improve matters In connection with National Pharmacy Week, he called attention to the educational campaign conducted during the last three months by proper cooperative advertising in the local papers The object was to make the public pharmacy conscious Mr Frankfurter believed that a return to dignified rational pharmacy was inevitable and that the development was well advanced Through cooperative movements pharmacists were encouraging the writing of prescriptions by physicians Only recently a new and fertile field had been investigated through professional advertising and educational work among veterinarians This group had taken a considerable interest in prescription writing

In closing the speaker pointed out that although the sales of side line items in his store had markedly decreased in the last several years, the volume of pharmaceutical business had decreased but little

After some brief discussion on the subjects presented by the speakers, a rising vote of thanks was voted

RUDOLF O HAUCK, *Secretary*

TESTIMONIAL DINNER TO PRESIDENT FISCHELIS

A testimonial dinner will be tendered to Dr Robert P Fischelis in honor of his election to the presidency of the AMERICAN PHARMACEUTICAL ASSOCIATION Sponsored by the New York Branch of the A PH A this happy event will be celebrated in the Hotel Pennsylvania, New York City, Thursday evening, January 10, 1935

Dr Fischelis has served American pharmacy with conspicuous ability and his devotion to the cause, his high ideals and the effort he has put forth in raising the standard of pharmaceutical practice throughout the Nation richly entitles him to the respect and esteem in which he is held by every true follower of our high and honorable calling

Tickets may be obtained from Hugo H Schaefer, *Chairman*, 115 West 68th St, New York City at $4 00 per plate

NORTHERN NEW JERSEY

The ninth meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at Rutgers University College of Pharmacy on Monday, October 15th

David L Cowen presented an interesting paper on 'Early American Legislation Pertaining to Pharmacy," which will appear in a later issue of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION Photostatic copies of the Virginia Act of 1736 entitled "An Act for Regulating the Fees and Accounts of Practicers in Physic" and the South Carolina Law of 1751 entitled "An Additional and Explanatory Act to Act for the Better Ordering and Governing of Negroes and Other Slaves' discussed by Mr Cowan were presented to the college and will be framed and added to the library

Professor C L Cox was elected secretary of the branch to fill the vacancy caused by the resignation of Doctor L W Rising who returned to the University of Washington this year

The program committee outlined its plans embracing many interesting and instructive features for coming meetings The next regular meeting will be held on Monday, November 19th

C L COX, *Secretary*

PITTSBURGH

The opening meeting of Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held Thursday evening, October 25th, in the main lecture room of the Falk Clinic The meeting was opened by President Raymond J Hornfeck of McKeesport

After reading of the minutes by Secretary McGinnis, the president introduced Dr E C Reif who presented an interesting report of the Washington meeting of the A PH A He gave a vivid word picture of the dedication services of the American Institute of Pharmacy A discussion followed in which references were made to the time when the Headquarters Building was a hope and now is a reality Several activities of the Pittsburgh Branch incidental to making the building a success were brought to mind

President Hornfeck introduced Dean C Leonard O'Connell who spoke on Problems of Modern Medicine" In his opening remarks the speaker referred to the codes in their operation and said that what we need in pharmacy in place of ineffective codes is plain old-fashioned honesty

He pointed out that the orderly economic flow of merchandise from its source to the ultimate consumer required the three agencies, manufacturer, wholesaler and retailer, that the increased number of more aggressive merchandisers with their chief appeal based upon deep cut rates on standard commodities as "loss leaders" tended to eliminate the wholesaler, that this gave rise to two distinct groups of retailers, from the standpoint of buying, whose basic costs radically differ, and that in the light of these facts the code provision prohibiting the sale of merchandise at prices less than cost is indeed an empty victory for the small distributer

Dr O'Connell stated "It is certainly uneconomic to expect the ultimate distributer to defray the cost of retail distribution"

In continuing Dr O'Connell said that if the large unit distributers were able to demonstrate their ability to get all the commodities they offer to the consumer at a great saving, there would be some merit to their argument that they can afford to distribute for less Contrary to this, however, this underselling plan is only successful to the extent that such distributers can sell 'own brand" items at unusual profits to offset losses from standard underpriced articles He further stated that the pricing of well known merchandise at a price of cost or less with the overt intention of leading the public to believe that all merchandise is sold on a similar basis, is clearly unethical He said, 'if manufacturers have permitted their goods to be tossed about steadily losing original value in the public mind, the burden for restoration is upon them rather than upon the small retailer"

The speaker stated that a fair minimum price for any commodity should be the basic cost of the item plus the honest efficient cost of selling and that the selling expenses would be at least 20% of the sales On such a basis an item costing $4 00 per dozen would sell for $5 00, or 42¢ a unit, and an $8 00 item would sell for $10 00 per dozen or 83¢ a unit Dr O'Connell concluded by stating that such a plan could only be brought about by the retailers, convincing the manufacturers that they were earnest and sincere in their opposition to unethical and uneconomic practices—this could easily be done if the retailers would simply refuse to distribute items whose resale price did not include their costs of distribution

STUDENT BRANCH PITTSBURGH COLLEGE OF PHARMACY

John Gibson Campbell was elected *President* of the senior class of the Pittsburgh College of Pharmacy, other officers chosen by the Seniors for the year 1934–1935 school term are *Vice President*, Jack Leroy Rosenberry, Kittanning Pa , *Treasurer*, Fred H Stadtlander, Pittsburgh, *Secretary*, Miss Lillian Jane Cohen Washington, Pa President Campbell represented the Students' Branch as delegate at the 82nd annual convention of the AMERICAN PHARMACEUTICAL ASSOCIATION held in Washington in May 1934

Officers of the Junior Class are *President*, Walter O McGinnis, McKees Rocks, Pa , *Vice-President*, Charles M Kaetzel of Rimersburg, Pa , *Treasurer*, Isadore Browarsky Oakdale, Pa , *Secretary*, Glenn Kellogg, New Castle, Pa

Officers of the Sophomore Class are *President*, John J Todora, Aliquippa, Pa , *Vice President* Ralph G LeMoon, Erie Pa , *Treasurer*, William A Kane, Braddock Pa , *Secretary*, Miss Jane Beyer, Punxsutawney, Pa

Officers of the Freshman Class are *President* Robert C Kealey, Jeannette, Pa *Vice-President*, Robert L Peel, Jr , Sharon Pa , *Treasurer*, Vera Karel, Ambridge, *Secretary*, Betty Haeckler, Pittsburgh

STEPHEN WILSON *Acting Secretary*

EDITORIAL NOTES

OFFICERS-ELECT OF AMERICAN PHARMACEUTICAL ASSOCIATION

The Board of Canvassers upon tallying the votes find that the election of officers elect for 1935–1936 has resulted as follows

For *President* Patrick H Costello, Cooperstown, N D

For *First Vice President* Frank A Delgado, Washington, D C

For *Second Vice President*, J Lester Hayman, Morgantown, W Va

For *Members Elect of the Council*, James H Beal, Fort Walton, Fla , C H LaWall, Philadelphia, Pa ,R L Swain, Baltimore, Md

TURNER F CURRENS
C W BALLARD
HUGO H SCHAEFER, *Chairman*

THE WASHINGTON-BALTIMORE SECTION OF THE HISTORY OF SCIENCE SOCIETY

The Washington-Baltimore section of the History of Science Society held its November meeting in the American Institute of Pharmacy on Wednesday, the 7th

The *president* of the section is Dr James E Couch, and the *secretary* is M C Leikind, both of Washington

Charles H LaWall was the first speaker and the subject "Alchemical Symbols as Used in Pharmacy" This was an illustrated lecture

Dr W J Wilson, Consultant Manuscripts Division of the Library of Congress, spoke on 'The Fifteenth Century Latin Alchemy and Its Antecedents" and the discussion was led by Dr C A Brown, Bureau of Chemistry, *U S Department of Agriculture* Dr Brown enlarged on his remarks, using lantern slides

About seventy-five members and visitors were present, many of whom are members of the History of Science Society

Mrs Charles H LaWall, President and Mrs R P Fischelis were also present

'The organization of the History of Science Society was the result of a constantly growing interest in the study of the history of science In 1919 a group of scholars interested in the cultural phase of science, under the direction of Dr Lynn Thorndike, formed a section of the American Historical Association In 1920 a similar section was organized in the American Association for the Advancement of Science, with the late Dr William A Locy as chairman The formation of the History of Science Society by Dr David Eugene Smith was the result of the merging of these two groups The need of an organization of this kind was evidenced by the rapid recognition accorded the History of Science Society It was organized in Boston, January 12, 1924 and was incorporated under the laws of the District of Columbia, January 30 1925 It was affiliated with the American Association for the Advancement of Science, April 26, 1926 and admitted as a constituent member of the American Council of Learned Societies, February 2, 1927 The Society meets annually usually with the American Association for the Advancement of Science or the American Historical Association, and participated actively in the Second International Congress of the History of Science and Technology in London in 1931"

Officers of the Society are *President*, Harvey Cushing, Yale University, New Haven Conn., *Vice-Presidents*, Charles A Browne, Washington, D C , Chauncey D Leake, San Francisco, Calif , *Treasurer and Corresponding Secretary*, Frederick E Brasch, Library of Congress, Washington, D C , *Recording Secretary*, Lao G Simons, Hunter College, New York, N Y

PHARMACEUTICAL CONDITIONS IN DENMARK

A party of Danish pharmacists recently visited England, and, from information obtained from them, *The Pharmaceutical Journal* gives the following particulars regarding pharmacy in Denmark

"Pharmaceutical education and examination is in the hands of the Ministry of Education, and the pharmacy law is administered by the Health Department of the Ministry of Home Affairs, which also fixes the prices at which drugs and pharmaceutical preparations may be sold The number of pharmacies is limited to about one to 10,000 of the population, there being altogether about 300 pharmacists The privilege of owning a pharmacy is granted by the State, and reverts to the State at the death of the owner The establishments are strictly pharmaceutical in character, and are inspected by pharmacist-inspectors, of whom there are three, these also inspect the works of manufacturing pharmaceutical firms An inspector spends a day in each pharmacy Among his

duties is the taking of samples for analysis, the analyses being carried out by the inspector himself in the laboratory of the Inspectorate A fee for the inspection is charged, which is graded according to the size of the pharmacy and amounts to about £10 for the larger pharmacies Inspections may be made as often as the authorities think fit"

THE PRACTICE OF PHARMACY IN EGYPT

Chemical and bacteriological analysis in Egypt is conducted by many of the pharmacists, who work in close cooperation with their medical confrères and are treated by the latter with the respect and esteem extended by one professional body to another There are in Egypt about a thousand proprietor pharmacists and 200–300 assistant-pharmacists the majority of these are concentrated in a few large towns

The "drogueries" or drug stores, of which there are quite a number in Egypt sell most of the lines usually associated with the chemist in England and the druggist in the United States, but which are not supplied by the pharmacist in Egypt, France or Germany Cameras, cigarettes, silverware stationery and many other things which the professional pharmacist of Cairo or Alexandria would disdain to handle are offered by the drogueries" of these cities in great variety These are the shops which make effective window displays of their goods and which have handsome decorations, fittings and general appearance They do not, however, indulge in dispensing work in the sale of poisons, these functions being restricted to the pharmacist proper —From the *Indian and Eastern Druggist* for October

SCHOLARSHIPS AND AWARDS

The 1934 Leverhulme Pharmaceutical Scholarships, Great Britain, have been awarded to Frank Charles Cumberland, Arnold Rogers and Maurice William Partridge, students of Nottingham University College The scholarships were founded by the first Lord Leverhulme, and are open to student associates of the Pharmaceutical Society of Great Britain They have each a value of £60 the first carrying also the award of a gold medal and a prize of books, and the second a similar prize of books

Schools of Pharmacy in the United States award scholarships for various researches and the number is growing showing the increased interest in pharmaceutical activities

The AMERICAN PHARMACEUTICAL ASSOCIATION Research Award of $1000 00 has been granted to the Florida School of Pharmacy The studies on Drug Extraction are being continued under the direction of Dr W J Husa

The council of the American Association for the Advancement of Science has appropriated $3000 00 for grants in aid of research It is the policy of the association to make the grants of small amount and its preference to give them to research workers in smaller and less well-known institutions Applications should be addressed to the permanent secretary of the American Association for the Advancement of Science, Smithsonian Institution Building, Washington, D C ,

For the third time since its foundation the Nobel award for chemistry has been granted to an American The winner of the prize for 1934 is Dr Harold C Urey, Leonia, N J He discovered the basis of what is popularly known as ' heavy water " The work in part was done by Dr F G Brickwedde, celebrated for his process for liquefying helium

---

The editorial offices have been presented by Margaret and Walter Cousins, Sr , Dallas, Texas with a unique paperweight representing a Texas longhorn The head was carved out of the heart of a mesquite tree by Bill Hickman of the famous Texas ranger family, and the horns are from a genuine Texas longhorn Mr Hickman carved it with a pocket-knife and one who knows the mesquite will realize that it was a task to produce this striking design

PERSONAL AND NEWS ITEMS

President Robert P Fischelis, of the AMERICAN PHARMACEUTICAL ASSOCIATION, secretary of the New Jersey State Board of Pharmacy, addressed the student body of the College of Pharmacy of the University of Maryland in Baltimore on Thursday, November 8th, on the subject ' Contemporary Pharmacy "

The same evening he also addressed the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION on the subject ' Federal Regulation of the Drug Industry '

Lyall J Klotz has accepted a position as Professor of Pharmacy in the College of Pharmacy, Ferris Institute, Big Rapids, Michigan Dr Klotz was one of the two to receive the first Ph D 's awarded by the University of Florida

Louis Magid has accepted a position in the Research Department of the Wm S Merrell Co , Cincinnati Dr Magid held the AMERICAN PHARMACEUTICAL ASSOCIATION Research Fellowship during two years for his work on Drug Extraction He received the Fairchild Scholarship award for 1931

Prof P A Foote of the University of Florida, spent the summer visiting points of pharmaceutical interest in several countries of Europe He studied methods of instruction in the Colleges of Pharmacy in London, Amsterdam, Heidelberg Leipzig, Berlin and Paris

Dr Oliver Kamm was the principal speaker at the November meeting of the Science Club of the University of Georgia

Graduate student, University of Minnesota, Karl Goldner, passed his preliminary Ph D examination minor—organic chemistry, major—pharmaceutical chemistry, on Monday, October 15, 1934 The examiners were Drs E D Brown, W Lauer, C A Mann, L I Smith, C H Rogers and F J Wulling Dr Rogers, in charge of the major, acted as chairman of the Examining Committee

W Bruce Philip, former Counselor of the National Association of Retail Druggists, is maintaining an office in the Munsey Building, Washington, D C He is establishing a bulletin service for retail druggists

Rowland Jones, Jr , of Gettysburg, So Dak , has been named representative of the National Association of Retail Druggists He has established his office in Washington, D C.

It has been announced that J A O Preus former governor of the State of Minnesota, has assumed duties as Legal Advisor of the N A R D

Dr Frederick J Cullen, former Chief of Drug Control in the United States Food and Drug Administration, has been appointed general representative for the Proprietary Association at Washington He succeeds the late Ervin F Kemp

Dr Cullen is a graduate registered pharmacist, as well as a doctor of medicine, and has practiced in both fields During the World War he was regimental surgeon of the Tenth United States Field Artillery and served overseas with the Third Army Division He was wounded at Chateau Thierry and holds two citations for bravery under fire He is a member of the Order of the Purple Heart

Robert Rice, of Missoula Mont , has been awarded the H A B Dunning Scholarship in the School of Pharmacy, University of Maryland He will spend part of his time teaching in addition to work on his Doctor's degree

Among recent visitors at the American Institute of Pharmacy were Bertil Ronnmark, Control Laboratories, Stockholm Sweden, fellow of the Swedish Pharmaceutical Association, studying under Dr Reid Hunt Harvard University, Dr C A Rojahn, University of Halle, Germany, Editor of the YEAR BOOK

OBITUARY

ERVIN F KEMP

Ervin F Kemp, general representative of the Proprietary Association and in charge of its headquarters in Washington, died October 23rd, at his home in Sandy Springs, Md He was sixty two years old and has been connected with the association for thirty years, in Chicago and Washington, having charge of its bulletin service and general publicity and editing the monthly periodical, *Standard Remedies* Mr Kemp was born in Grand Rapids, Mich , where he spent his boyhood Before going with the Proprietary Association, he was a newspaper man in several Ohio cities He was a member of the AMERICAN PHARMACEUTICAL ASSOCIATION His wife, Nellie B Kemp, survives him

ROBERT H LAND

Robert H Land, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and prominent Augusta pharmacist, member of city council and former president of the Georgia Pharmaceutical Association, died at his home October 10th, after a long illness, aged 68 years

He was born November 6, 1866, in South Carolina, a son of Robert H and Elizabeth Griffin Land With his parents, he moved to Augusta in his youth, and his father for many years was a prominent pharmacist of Augusta

Mr Land entered the drug business about 50 years ago, organizing the Perrin and Land Drug Company, in 1896 the partnership was dissolved and he organized the Land Drug Company This he operated for more

than thirty years, until his retirement, when he was succeeded by Fred J Bodeker, who had been associated with him forty-one years Following his retirement from active business he became associated with the McKesson-Murray Drug Company as consulting pharmacist

As stated, the deceased had served as president of the Georgia Pharmaceutical Association, also for a period as chairman of the Georgia Board of Pharmacy and was a member of the board of trustees of the University Hospital

DR PHILIPP FISCHELIS

Dr Philipp Fischelis, professor of Histology, Embryology and Pathology at the Temple University School of Dentistry, died of heart disease, October 30th, at his home in Philadelphia, aged 76 years

Dr Fischelis had devoted much of his time to dentistry and dental education since his retirement as a physician Educated at the universities of Leipzig Koenigsberg and Berlin, he came to this country in 1889 He served at various times as instructor of rhinology and laryngology at the Philadelphia Polyclinic as special laryngologist at Mount Sinai Hospital and associate professor of Histology and Embryology at Medico-Chirurgical College

He was a member of the American Association for the Advancement of Science and many medical societies the author of "Developments of the Thyroid and Thymus Glands" and "Development of the Lung" and co author of several other works

Surviving are three sons, Robert P Fischelis, president of the AMERICAN PHARMACEUTICAL ASSOCIATION and secretary of the New Jersey State Board of Pharmacy, Bert F and William Fischelis, and three daughters, Marie, Alice and Anna

SOCIETIES AND COLLEGES

DISTRICT MEETING OF BOARDS AND COLLEGES

The 1934 District Meeting of Boards and Colleges of Pharmacy was held at Mammoth Cave Kentucky The five states representing this district include Indiana, Kentucky, Illinois, Michigan and Ohio

Representatives of the Indiana Board of Pharmacy were E A O'Harrow, *President*, Bloomington, R B Rothrock, Evansville, and John A J Funk Galveston The Indiana Colleges were represented by Dean Jordan Professors Zufall and DeKay and Mr Heine of Purdue, Dean Niles and Professor Ambrose of Indianapolis College of Pharmacy, and Dean Lofgren of Valparaiso College of Pharmacy

DISTRICT MEETING AT LURAY VA

Seventh and Eighth District of Virginia pharmacists met at Luray, November 22nd Vice President Edward P Berlin issued the call for the meeting of which Walter S Nicklin is the chairman Subjects of the meeting are listed

Price Control as I Would Like to See It," by C P Rector of Fredericksburg, Small Town Drug Store Problems and Some Changes That Would Help," by W E Hisey of Shenandoah, "What the City Pharmacy Is Up Against, and What Should Be Done about It," by J E W Timberman, Alexandria, Constructive Suggestions for the Improvement of Our Association, by C S Brooks, Winchester

Secretary E F Kelly is named as speaker on 'The Future of the Drug Code "

SIXTH DISTRICT ASSOCIATION OF SOUTH CAROLINA

Resolutions calling upon the NRA for relief in the form of a minimum mark up from manufacturers' wholesale list cost of at least 15 per cent were adopted by the Sixth District Judicial Circuit Pharmaceutical Association, which met in Rock Hill October 25th

President King introduced Vice-President J D Ashmore of Greenville, who reported on the high spots of the N A R D convention in New Orleans Unfair Trade Practices" was the topic of an address by Secretary-Treasurer J M Plaxco of Due West Hilton Ratterree, Jr , of Rock Hill, outlined the legislation that probably will be recommended this year H R Wood of Chester, led an interesting round table discussion on prescription pricing

OFFICERS-ELECT OF AMERICAN PHARMACEUTICAL ASSOCIATION, 1935–1936

President, Patrick H Costello, Cooperstown, N Dak , Retail Pharmacist and Secretary North Dakota Board of Pharmacy *First Vice-President*, Frank A Delgado, Washington, D C , Pharmacist, Chemical Division, Department of Commerce *Second Vice-President*, J Lester Hayman, Morgantown, W Va , Secretary, West Virginia Pharmaceutical Association and Professor of Pharmacy, School of Pharmacy, University of West Virginia *Members of the Council* James H Beal, Fort Walton, Fla , Teacher of Pharmacy, retired, Charles H LaWall, Philadelphia, Pa , Dean, Philadelphia College of Pharmacy and Science, Robert L Swain, Baltimore Md., Deputy Food and Drug Commissioner of Maryland and Secretary, Maryland Board of Pharmacy

The officers elect, named above, will be installed at the next annual meeting of the ASSOCIATION to be held in Portland, Ore , in 1935

ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS

The Association of Official Agricultural Chemists held its annual meeting in Washington, October 29th–31st This was the fiftieth anniversary of the Association and its attendance was large Among those present were two charter members, C W Dabney and W G Gascoyne W D Bigelow delivered the fourth Wiley memorial address

For the first time in its history the Association had as its president a Canadian chemist R Harcourt of the Ontario Agricultural College

The following were elected officers of the Association for the ensuing year *President* F C Blanck *Vice President* H H Hanson *Secretary Treasurer,* W W Skinner *Additional members of the Executive Committee* C C McDonnell, H R Kraybill R Harcourt and F S Frisby

MEETING OF WHOLESALE DRUGGISTS AND FEDERAL TRADE COMMISSION TO MEET

Under the sponsorship of the Federal Trade Commission, a trade practice conference for the wholesale drug industry in the United States will be held in the Congress Hotel Chicago December 6th Charles H March member of the Commission will preside

The conference is being called at the request of the National Wholesale Druggists Association, which at its annual convention in White Sulphur Springs, W Va October 13th approved a recommendation by President Henry D Faxon as follows

'Your board concurs in the recommendation of the president that this association should apply for a fair trade practice conference for the whole drug trade industry under the auspices of the Federal Trade Commission within the very near future

'The purpose of the conference is to eliminate certain unfair methods of competition and trade abuses of which the commission has been told, there has been complaint in the industry including such practices as secret rebates misbranding price discrimination false invoicing substitution of products without authority and other unfair practices"

Members of the National Wholesale Druggists' Association do the commission says approximately 75 per cent of the total wholesale drug business in the United States with an annual volume of business of approximately $500 000 000 00 The commission expects that a large representation of wholesale druggists will attend the conference, from probably every state in the Union

In addition to Commissioner March, who will preside the Federal Trade Commission will be represented at the conference by George McCorkle director of the trade practice conference division of the Commission

ALLIED PROFESSIONS MEET IN NEW JERSEY

Representatives of the Medical Society of the State of New Jersey the New Jersey State Dental Society the New Jersey Pharmaceutical Association and the New Jersey State Nurses' Association perfected an organization to be known as the Conference of Allied Medical Professions of the State of New Jersey The purpose of this society is to provide a medium for discussing matters of common interest to the various groups It is planned to foster the organization of county and district groups Meetings are to be held at least once a year and other meetings may be called by the chairman or by action of the conference

NORTH PACIFIC COLLEGE

All faculty members of North Pacific College of Pharmacy and a large group of students were in attendance at the Junior Oregon State Pharmacy meeting held at Multnomah Hotel October 10th Professor Grill gave a talk on Professional Pharmacy" and Dean Mickelsen spoke on 'Outstanding Accomplishments of Oregon Pharmacists" and the coming American pharmaceutical convention Dean Mickelsen was also principal speaker at the Eastside Lions Club, October 9th His subject was Biologicals in Medicine' He also spoke at the Eastside Commercial Club on "The Role of the Pharmacist in the Community" the latter being broadcast

---

We are in receipt of two illustrated reprints from Prof C H LaWall of articles that appeared in the *Journal of Chemical Education* in August and October the former dealing with the Virgin Mary as the Patroness and Protectress of Pharmacy and the other with St Cosmas and St Damian, Patron Saints of Pharmacy and Medicine

LEGAL AND LEGISLATIVE

CINCHOPHEN AND AMIDOPYRINE DANGEROUS TO HEALTH AND LIFE SAYS FOOD AND DRUG CHIEF

Wide-spread use of two drugs—Cinchophen and Amidopyrine—are subjects of a bulletin of the Federal Food and Drug Administration

'Current medical literature contains many reports which clearly indicate that these drugs are dangerous to health and life," says W G Campbell Chief of the Food and Drug Administration "The gradual development of serious poisoning from the use of these drugs is often so insidious that the danger is not recognized by the user Cinchophen causes a degeneration of the liver cells Amidopyrine may cause a reduction in the number of white blood cells, a condition called agranulocytosis'

NEW RULES AND REGULATIONS PROMULGATED BY THE NEW YORK STATE BOARD OF PHARMACY

At the last meeting of the New York Board of Pharmacy and in accord with the powers vested in them by law, three new pharmacy rules were proposed and have received the approval of the New York State Regents The rules follow

Rule 24 —Misbranding —A drug or medicine shall be considered misbranded if labeled, sold or offered for sale under a name or title which deceptively imitates the official title of any drug or medicine that is listed in the National Formulary, United States Pharmacopœia or the United States Dispensatory

Rule 25 —Imitation —A drug or medicine shall be considered an imitation if in any way it deceptively imitates any official drug or medicine in the National Formulary, U S P, or United States Dispensatory

Rule 26 —Habit Forming Drugs —Any medicine which contains morphine, opium, heroin, chloroform, cannabis indica, chloral hydrate, acetanilide, barbituric acid or any of the poisons listed in Schedules A and B of Section 1363 of the Education Law or any derivative or preparation of any of these substances or any other drug or medicine, if the content of its container, or any part thereof, taken at one time, are likely to prove poisonous, deleterious, or habit forming, shall be sold only by a licensed pharmacist, who shall take reasonable precautions to acquaint the purchaser of the nature and effects of such drug or medicine

NEW JERSEY LEGISLATION

The following legislation was passed during 1932 1933 and 1934 and signed by Governor A Harry Moore, of New Jersey —Discontinuing licensing assistant pharmacists and preserving the right of assistants registered as such, with provisions made for their advancement The law stated that only high school graduates and graduates of recognized colleges of pharmacy could take examinations to become registered pharmacists Prohibiting the use of the terms "pharmacy," "drug store" etc, by places other than those supervised by registered pharmacists Requiring licenses for handling narcotic drugs by wholesalers and instituting requirements for pharmacists identical with those in the Federal Narcotic Act Supplementing the act regulating the practice of pharmacy to prevent violations by making it possible for the Board of Pharmacy to serve summons or warrant Regulating the sale of barbital and other narcotic drugs, and stopping the sale of certain proprietary drugs by patent medicine stores An act governing the compounding of medical prescriptions to prevent adulteration The act stops the altering of prescriptions in any manner whatsoever unless approved by the prescriber An act which repeals sundry acts relative to narcotic drugs and strengthens the requirements of the act passed in June 1933 Annual registration of pharmacies, and under this act the board will not issue permits unless they are satisfied that a drug store is in personal and continuous charge of a registered pharmacist Allowing the Board of Pharmacy to revoke licenses of pharmacists convicted of crimes but giving such pharmacists right of appeal to the Supreme Court

SALES BELOW COST PROVISION UPHELD

Judge Robert Pollard of the State Circuit Court of Virginia, recently sustained the constitutionality and validity of the State NRA Act and the Retail Drug Trade Code of Fair Competition He overruled a demurrer to the bill of complaint charging violation of the provision in the Retail Drug Code prohibiting selling below cost This was the first case

brought before either the Federal court or the State in Virginia

OFFICIAL PREPARATIONS TAXED

A ruling from Deputy Internal Revenue Commissioner Mellott is to the effect that U S P Tincture of Ginger under whatever name sold is classified as an intoxicating liquor and the manufacturer thereof must qualify as a rectifier and pay rectifiers' special tax The product is subject to tax on rectified spirits and the sale thereof would require wholesale or retail liquor dealers' special tax stamp even though such sale is for medicinal purposes Stamps obtainable from local Internal Revenue Collectors must be placed upon the bottle in which the preparation is distributed and sold The tax is at the rate of approximately 30 cents per gallon of manufactured product

CODE FOR PHARMACEUTICAL BIOLOGICAL MAKERS

Approval of a code of fair competition for the manufacturing pharmaceutical and biological industry has been announced by the NRA The code which establishes the maximum work week of forty hours and a minimum wage of 35¢ per hour, is expected to reduce working hours in the industry by 10 per cent and slightly increase the minimum weekly earnings over the 1929 averages

Pharmacists, research and scientific workers chemists and executives who receive $35 00 or more weekly, are exempted from the maximum hour provision, as are outside salesmen The code became effective November 5th

MAINE PHARMACEUTICAL ASSOCIATION

For the purpose of securing closer affiliations with the parent body and for the setting up of local druggists' organizations in all Maine communities now lacking them, President Burton K Murdock of the Maine Pharmaceutical Association has appointed two members from each county of the state to serve as a Maine Council of Pharmacy Organization of the council was effected at a meeting in Portland of the executive committee of the State association

The new council is to elect one of its members to serve on the Association s executive committee Caldwell Sweet of Bangor, and C C Libby and H D Gerrish, of Portland, were named to represent wholesale drug houses of the state on the council

The mid-winter meeting of Maine Pharmaceutical Association will be held in the State House in Augusta February 15, 1935 The annual meeting will be held at the Rangeley Lakes House Rangeley June 26–28 1935

SWITZERLAND PHARMACY

The Swiss Society of Pharmacy directs that window shows should demonstrate the difference between a pharmacy and a drug store In making displays it is necessary to take into account the character of pharmacy and to respect its professional dignity Wholesale houses who do not support the interests of pharmacy should not be allowed space in windows All samples must be plainly marked as such and not be given away to the public except in packages smaller than the regular size The distribution of free gifts is strongly deprecated, as is coupon trading and all sales stunts It is permissible to distribute a calendar diary, note book or other small similar object, which can be considered as a favor Pharmacists are forbidden to advertise in any way competition on a price basis

THE FIFTEENTH INTERNATIONAL RED CROSS CONFERENCE

The Fifteenth International Red Cross Conference was held in Tokyo, beginning October 20th This was the first International Red Cross Conference ever held in the Orient, fifty seven countries were represented, the number of delegates being two hundred and fifty two

The Conference was opened by Prince Lyesato Tokugawa who presented an address in which he expressed the gratitude of the Imperial family and praised the achievements of the Red Cross Responses were made by Col G Huber vice president of the International Committee, and Professor Nolf, president of the Red Cross Society of Belgium Prince Kan in read a message for the Empress Prince Lyesato Tokugawa was selected as the chairman of the Conference

Grace I Harper registrar of the New Jersey College of Pharmacy has donated to the AMERICAN PHARMACEUTICAL ASSOCIATION a Homeopathic Cholera Case Presumably, this dates back to about 1834

BOOK NOTICES AND REVIEWS

ABSTRACT OF PROPOSED PHARMACOPŒIAL CHANGES

The first Abstract of Proposed Pharmacopœial Changes has been issued This deals with Inorganic Chemicals The publication of abstracts of changes proposed for the Pharmacopœia is in compliance with the recommendations of the Pharmacopœial Convention that all who are interested may follow the revision Reprints will be mailed without charge to anyone who is interested The Abstract is printed in the September JOURNAL, beginning on page 927

Annual Survey of American Chemistry, Volume 8, 1933 National Research Council The Chemical Catalog Co, Inc, New York City Editor Clarence J West, Director, Research Information Service, National Research Council 403 pages Price $4 50

Twenty five topics are covered in the volume, as follows Theories of Solutions, Kinetics of Homogeneous Gas Reactions, Subatomic Phenomena, Thermodynamics and Thermochemistry, Colloids, Contact Catalysis, Structure Determination by X-Ray and Electron Diffraction, Electrochemistry, Analytical Chemistry, Compressed Gases, Aliphatic Compounds, Carbocyclic Compounds, Heterocyclic Compounds, Pharmaceuticals, Biochemistry, Ferrous Metals in 1932 and 1933, Insecticides and Fungicides, Chemistry of the Silicates, Ceramics, Petroleum Chemistry and Technology, Cellulose and Paper, Leather, Paints, Rubber, Gaseous Fuels during 1932 and 1933

The chapter on Pharmaceuticals has been prepared by Clifford S Leonard, Director of Research, of the Burroughs Wellcome & Co Experimental Research Laboratories One hundred and seventy-five references conclude the chapter and quite a number of the articles referred to are from the JOURNAL OF THE A PH A

Edgar Grim Miller, Jr, of the Department of Biological Chemistry, Columbia University has contributed the chapter on Biochemistry

The chapter on Insecticides and Fungicides has been prepared by R C Roark of the Insecticide Division, Bureau of Chemistry and Soils, U S Department of Agriculture Two hundred and forty-six references conclude the chapter

F W Willard at the conclusion of the Foreword states that "to Dr C J West must be rendered the entire credit for this useful work. His continued interest and discriminating judgment render this survey more useful with each issue"

'Obituary of Frederick Belding Power" by Dr C A Browne

"Observations upon the Essential Oil Industries of Foreign Lands," reprinted from *Journal of the Chemical Education*, March 1934

LIST OF TRADE NAMES

A new list of trade names in use by member firms of the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers Association has been prepared under the auspices of the Patent and Trade-Mark Committees of the respective groups

The purpose of the compilation is to furnish information in the preliminary consideration of new trade names It has been revised to August 1, 1934

It is the desire of the associations that the booklet receive the widest possible distribution not only among members, but among all others interested in this important field including firms and individuals identified with allied organizations, trade mark attorneys and association trade mark bureaus

Copies may be obtained from Carson P Frailey, Executive Vice President and Secretary, American Drug Manufacturers' Association, Albee Building, Washington, D C, or from Clarence W Warner, Secretary, American Pharmaceutical Manufacturers Association, 246–250 High Street, Newark New Jersey

---

OFFICERS OF THE DAIRY, DRUG AND FOOD OFFICIALS

Henry Hoffman, Jr, chief of the food and drug department of Minnesota, was elected *President* of the Association of Dairy, Food and Drug Officials of the United States at the close of its four-day convention held in Atlanta, October 15th–18th Other officers named are Phil Taylor, chief food inspector of the Florida department of agriculture, *Vice President*, and W C Geagley, state chemist of Michigan (reëlected) *Secretary Treasurer* Mrs Sarah Vance Dugan, chief of the food and drug control of Kentucky, and Walter S Frisbie, chief of the office of cooperation of the federal food and drug administration, Washington, were named members of the executive committee.

COMMENTS ON SOME EVENTS OF 1934

American pharmacists will refer to the completion and dedication of the American Institute of Pharmacy as no less than an outstanding and most important event in the history of the AMERICAN PHARMACEUTICAL ASSOCIATION The following is quoted from an editorial in a Washington paper

The beautiful new home of the AMERICAN PHARMACEUTICAL ASSOCIATION, Constitution Avenue at Twenty Second Street, has a significance exceeding even the important scientific purposes to which it will be dedicated It represents a tide which is working in the affairs of men It is a symbol of a trend '

Those who have encouraged the effort have looked upon their contributions as expressions of loyalty, public service and desire to promote pharmacy They realize that in proper shaping of affairs the thought must lead that success depends on unison in action as far as this is reasonably possible, and confidence within the groups is essential strengthened by a right understanding with related activities

The Chicago World's Fair, recently brought to a close was eminently successful in every respect The Pharmacy Exhibit has brought pharmacy s message to the general public and has had a distinct educational value Pharmacy responded to an opportunity and profited thereby

This year's celebration was the decennial of Pharmacy Week Those who have had an active part in the annual event have shown their loyalty to pharmacy in an effort which extends beyond the activities of the seven days designated as Pharmacy Week

While there has not been entire approval of the codes it may truly be said that those who have directed the affairs under the drug codes have worked faithfully and accomplished much, they have sought the greatest good for the greatest number ' and they have received commendation not only from their own constituents but code authorities of other organizations

The National Council on Pharmaceutical Practice has presented as a first objective a study of the needs of each field of activity and has in preparation an announcement of these needs to the country, it is proposed to make a restatement of codes of ethics and practice as the basis of a high professional standard for each group The study is being shaped into action

Study of food and drug legislation, preparatory for the next session of Congress is being carried on The aim to provide better standards brought the AMERICAN PHARMACEUTICAL ASSOCIATION into life and to serve the public has always been a purpose of the organization and there is evidence of closer coöperation of the divisions of the drug-trade activities to formulate legislation along these lines of thought

Researches in professional accuracy are being promoted by the AMERICAN PHARMACEUTICAL ASSOCIATION A number of reports have appeared in the JOURNAL based on work which develops a better understanding of this important subject in prescription practice The Committee on Weights and Measures is collecting factual information relative to weighing and measuring apparatus These investigations contribute a valuable service to pharmacists, to the officials who supervise and direct the service of pharmacy, to physicians, dentists and the public

In order to obtain a complete picture of the prescription filling activities of pharmacy a study was included as an integral part of the National Drug Store Survey This report has been published by the AMERICAN PHARMACEUTICAL ASSOCIATION in cooperation with the U S Department of Commerce Bureau of Foreign and Domestic Commerce, the study was made in the Merchandising Research Division of the Bureau Further studies are being made and it is hoped that soon another edition will be ready for the press

Work on the U S Pharmacopœia XI and of the National Formulary VI is nearing completion, "Abstract of Proposed Changes" in the former is being published and reports on the latter have been made which indicate the improvements and changes in the forthcoming edition

The pharmaceutical exhibits prepared by various committees and organizations, and those sponsored jointly by the Revision Committees of the U S P and N F at meetings of National and State associations have been interesting and educational Those who gave of their thought and time have rendered most valuable services to pharmacy

E FLOYD ALLEN

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXIII DECEMBER 1934 No 12

E FLOYD ALLEN

E Floyd Allen, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1884, was born January 2, 1858, in Cranford County, Pennsylvania He received his early education in the Public Schools and State Normal School at Edinboro, Pa After teaching for a year, he found employment in the drug department in a general store operated by W R Allen, in Jefferson, Ohio In 1881, he matriculated as student in the Philadelphia College of Pharmacy and was graduated in 1883 A year later he entered into partnership with a brother in the retail drug business at Minneapolis and continued therein until 1930

Mr Allen at once took an active interest in the Minneapolis Retail Druggists' Association and in 1884 he became affiliated with the State Association and served as its secretary for a time and, in 1889, was elected president of the organization He recalls some of the work of the Association and the difficulties encountered in inducing the legislature to enact a pharmacy law, when it was found impossible to secure the passage of a bill furthered by the pharmacists a less desirable measure was accepted, hopeful that a later legislature would strengthen it Continued efforts in that direction were more or less successful and provision was made to establish the Department of Pharmacy which, in 1892, was organized under direction of Dean Frederick J Wulling

The results of the work in which our honored member had an active part have been gratifying Thereby better pharmaceutical service has been rendered and it is a source of pride to pharmacists and other citizens of Minnesota that the achievements of the pioneers have been faithfully carried on by their successors

Mr Allen is active in civic affairs and is interested in several successful enterprises

EDITORIAL

E G EBERLE, EDITOR 2215 Constitution Ave , WASHINGTON, D C

THE SEASON'S OPPORTUNITIES

A MOST eventful year of history is coming to a close, bringing us to a new year fraught with equally important and varied problems We join in worthy purposes in evidencing our fellowship and conveying assurance to the Government and to the public that we are optimistic or hopeful of greater stability in affairs and growing prosperity

References have been made on a preceding page relative to some important events It is only by good team-work, genuine cooperation, sympathy and a measure of unselfish devotion that real success can be achieved in pharmacy as well as other activities

As has been said in substance in these columns on other occasions—work within the ASSOCIATION gives pharmacists the opportunity of expressing their thoughts concerning pharmacy and the drug business, of exerting their influence, thereby a broader viewpoint is developed and a higher appreciation of their co workers is inspired

The substance of the foregoing message finds expression in the following That pharmacy may progress during 1935 because of strengthened enthusiasm and cooperation, and through greater opportunities for service That there may come the realization that, however much pharmacists may have done for pharmacy and its organizations, they, themselves, have profited more because of their active and concerted interest

In greeting the members and others, wishing them health and prosperity, the hope is expressed that their strength may be equal to the greater duties which have come upon them as citizens, and as members of this and other associations organized for professional advancement

NEW PHARMACOPŒIAL STANDARDS FOR COD LIVER OIL OFFICIAL JANUARY 1, 1935

ANNOUNCEMENT of New Pharmacopœial Standards for Cod Liver Oil, to become official January 1, 1935, was made by Chairman E Fullerton Cook in his report on The United States Pharmacopœia at the Washington meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION "These standards have been developed through a series of conferences with the vitamin experts of the United States and an extensive study of the general standard by the Sub Committee on Organic Chemicals The vitamin standards and vitamin assays represent the studies and conclusions of the U S Pharmacopœial Vitamin Advisory Board The release of this announcement, as an interim revision, has been authorized by the U S P Committee of Revision and U S P Board of Trustees, the standards to become official on January, 1935

The U S P Vitamin Advisory Board also announced the release of "Reference Cod Liver Oils" of known Vitamin A or Vitamin D potency, expressed in U S P X (1934) Units These "Reference Oils" are to be used as standards in Vitamin A or

D assays for determining the potency of Cod Liver Oil, Cod Liver Oil Concentrates, irradiated ergosterol or other irradiated or Vitamin A- or Vitamin D-containing products

Copies of U S P X (1934) interim revision Cod Liver Oil Text and the Reference Cod Liver Oil may be obtained by addressing Chairman E Fullerton Cook, of the Committee of Revision, 43rd and Woodland Ave , Philadelphia, Pa

THE NATION-WIDE NARCOTIC DRIVE

UNDER direction of the Chief of the Federal Bureau of Narcotics, Harry Anslinger, and Deputy Commissioner Louis Ruppel and other officials of the division made a nation-wide successful effort toward a clean-up of the narcotic traffic The Bureau is to be congratulated on their success, which will be followed by continued efforts The raid of December 7th–8th is said to be the most extensive drive ever made by Federal narcotic agents and has disclosed a most serious situation, not only because of the traffic in narcotics and the results, the relation to crimes, but because students in schools have been led to the use of narcotics

Recently, Commissioner H J Anslinger in a comprehensive press article stressed the importance of depriving narcotic peddlers of customers as a means of checking the narcotic evil "The legal dispensing of narcotics is carefully guarded and the laws are observed, violations are remarkably infrequent, the distribution of narcotics is through peddling and if the peddlers are deprived of customers they will cease to exist Illegal production of narcotics and export to countries seeking to eradicate narcotic addiction constitutes the other means of distribution for which correction has not been effected "

Liberty is taken in quoting from several editorials to recall early efforts of pharmacists and of the AMERICAN PHARMACEUTICAL ASSOCIATION in controlling narcotic addiction and references are given to action taken by the ASSOCIATION prior to the enactment of the Federal law It seems almost unbelievable, but nevertheless a fact, that when pharmacists first made concerted efforts to have restrictive legislation enacted, they found objection by legislators who thought there must be an ulterior motive back of their efforts, "because it reduced sales volume "

On page 567 of Volume 50 of the PROCEEDINGS is the report of Chairman H P Hynson which gave impetus to continue the study of addiction by the ASSOCIATION In Volume 51 is another report of the Committee (page 466) and a paper by James H Beal—' An Antinarcotic Law," which may be designated as a step toward national legislation relative to the handling of narcotics, for at the same meeting a draft for an antinarcotic law was submitted and a revision of it at the 1904 meeting (page 104), at which time also a paper on "Pharmaceutical Legislation with Special Reference to Antinarcotic Laws" (page 180) was presented The report made at the 1905 meeting indicates how seriously the conditions were viewed by pharmacists throughout the country That Congress did not realize the importance of antinarcotic legislation is evidenced by the fact that the federal law was not enacted until December 1914 The law added burdens to the many willingly assumed by pharmacists, quoting the closing paragraph of an editorial (1913) in advocating the passage of a federal antinarcotic law "It must not be imagined that any form of law can be devised that will be entirely free from objec-

tions, or that will not impose some burdens upon pharmacists and physicians, no matter how conscientious they may be in the handling of these drugs "

The references made are not intended to take credit for performing a duty to mankind, but to call attention to the important services rendered by pharmacists, because they recognized their duty long before general recognition was given to the control of narcotic sales, and all divisions of pharmacy entered into this service It is contended in the interest of the public, that the sale and dispensing of all medicines be restricted to those who, because of training and education, know the effect of medicines and realize their individual responsibility, as professional men and women, in safeguarding the public The situation developed adds emphasis to the importance of the latter statement

---

MEETING OF MEDICAL ADVISORY BOARD OF COMMITTEE ON ECONOMIC SECURITY

The following report is taken from the *Journal of the American Medical Association* of November 24, page 1627

The Medical Advisory Board, appointed by Secretary Perkins, chairman of President Roosevelt's Committee on Economic Security, to advise the committee's technical staff in its study of programs of public health, medical care and health insurance, met in Washington on November 14th and 15th The board met in executive session with all its members present as follows Drs Walter L Bierring of Iowa, Rexwald Brown of California, James Deacon Bruce of Michigan, George W Crile of Ohio Harvey Cushing of Connecticut Robert B Greenough of Massachusetts J Shelton Horsley of Virginia, James Alexander Miller of New York, Thomas Parran, Jr , of New York, George M Piersol of Pennsylvania and Stewart R Roberts of Georgia Other persons attending the meeting included Edgar Sydenstricker, in charge of the medical and health phases of the studies of the Committee on Economic Security, I S Falk of the technical staff, and by invitation Dr R G Leland and A M Simons of the Bureau of Medical Economics of the American Medical Association

"Nathan Sinai, Michael M Davis and W Frank Walker also met with the board as consultant staff members associated with the dental, hospital and public health advisory committees which have also been appointed by Secretary Perkins and which are to meet in the immediate future The meeting was opened by short addresses from Secretary Perkins and Edwin E Witte, executive director of the Committee on Economic Security Secretary Perkins and Mr Witte requested the close cooperation and advice of the medical profession in developing the health aspects of the President's program for economic security Owing to the fact that the Medical Advisory Board will make its recommendations to the Committee on Economic Security no public statement of its deliberations was given out, but we are informed by Mr Witte that the technical staff of the committee presented to the board tentative proposals on the three subjects above mentioned in extending and improving public services, tax supported medical care for dependents and other population groups affected with certain diseases and health insurance against illness

'Health insurance was discussed from the point of view of considering the details of a plan suitable to the various needs of the American people and the interests of the medical professions in the event that legislation on this subject is proposed by the administration The board requested an extension of time for this study Arrangements were effected whereby Dr Leland and Mr Simons will participate in this study with the technical staff It is anticipated that the board will meet again within the next six weeks or two months "

Other advisory committees are to be created, including dentistry hospital management and public health and it may be stated that the interests of pharmacy will receive consideration in due course

'Edgar Sydenstricker, chief statistician of the United States Public Health Service and director of public health activities for the Milbank Memorial Fund, has been placed in charge of the studies on Economic Security which it is hoped will yield the best possible means for providing adequate medical care for those who are without means ' "

SCIENTIFIC SECTION

FLUCTUATIONS IN THE RESISTANCE OF RATS TO NEOARSPHENAMINE AS OBSERVED IN ROUTINE TOXICITY TESTS OVER A PERIOD OF FOUR YEARS *

BY A E JURIST AND W G CHRISTIANSEN

Toxicity determinations on different samples of neoarsphenamine have been recorded in the literature many times and some papers have appeared describing toxicity studies on this substance For example, Durham, Gaddum and Marchal (1) have applied the "characteristic" curve or integrated frequency method of biological assay to neoarsphenamine, and Morrell and Chapman (2) found considerable variations in the resistance of individual rats in one rat colony It is proposed to discuss this question here from a somewhat different standpoint

In the course of the routine manufacture of neoarsphenamine each lot is tested for toxicity In these tests the Maximum Tolerated Dose of each lot is not determined but the test is of such a character as to determine whether or not the lot is satisfactory at a definite dosage The requirements of the National Institute of Health are that 60% or more of the test rats must survive at a dosage of 240 mg per Kg of body weight, using rats weighing approximately 100 Gm each With rare exceptions neoarsphenamine will pass such a test easily The routine tests carried out in this laboratory are run at two dosage levels, which for the purpose of this paper will be referred to as A mg /Kg and B mg /Kg [1] A large number of tests run during a period of years have shown certain variations in the number of rats surviving at these doses and the extent of this variation will become evident from the discussion which follows

EXPERIMENTAL

The rats used in these tests have been obtained from different sources so that the variations noted are little affected by this factor Five rats, each of approximately 100-Gm body weight, have been used in each of 963 tests, making a total of 4815 rats Of this number 3220 rats were injected at dosage level A and 1595 at level B The results have been grouped on the basis of monthly averages and cover a period of four years at dosage level A and three years at level B Also, since the toxic manifestations of neoarsphenamine are noted chiefly in the kidneys of the rats surviving on the sixth day after injection, the results of the gross examination of the kidneys of the surviving rats[2] has been included The extent of the kidney damage has been rated on a percentage basis using the following scale

Undamaged	100%
Slight damage	75%
Definite damage	50%
Marked damage	30%
Marked damage with congestion	20%

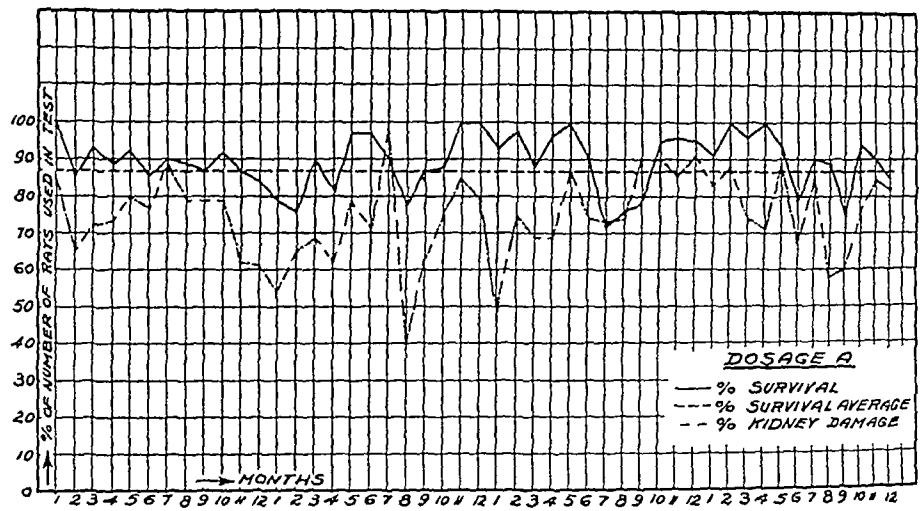
* Scientific Section, A PH A Washington meeting 1934

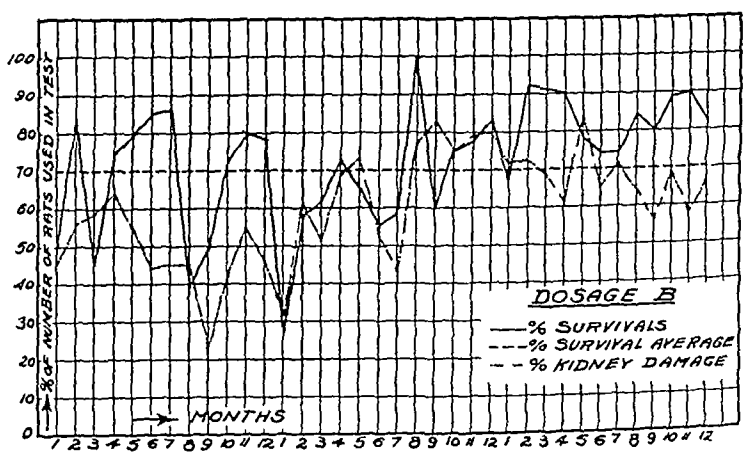
[1] The exact figures would contribute nothing to the discussion presented herein they are of course considerably higher than 240 mg /Kg

[2] The rats are killed and examined at the end of the test period

The results of these tests have been summarized in the attached curves The same scale is used in each case for the percentage of rats surviving and for the extent of the kidney damage noted in these rats The years are divided into twelve months each, numbered in order from one to twelve The dotted line drawn through the survival curve represents the average number of survivors in all

Fluctuations in Resistance of Rats to Neoarsphenamine as Observed in Routine Toxicity Tests of Dosages A and B over a Period of Four Years





the tests included in each curve, this average in each case is drawn from the gross totals, not by averaging the monthly percentages Separate sets of curves are given for the tests run at A mg per Kg and for those run at B mg per Kg

DISCUSSION

The results obtained with the dosage of A mg per Kg will be taken up first Out of a total of 3220 rats 2806 or 87% survived the test period Out of a total of

48 months the percentage of survivors fell below 87% only 13 times These drops below the average occurred in

January of the 2nd year	July of the 3rd year
February of the 1st and 2nd years	August of the 2nd and 3rd years
April of the 2nd year	September of the 3rd and 4th years
June of the 1st and 4th years	December of the 1st and 4th years

Therefore the fall below the normal average took place seven times during the months from June to September, these being the hottest of the year, and five times during the months from December to March, these being the coldest of the year These results, on the whole, appear to indicate that the resistance of rats to neoarsphenamine is independent of the season of the year during which the test is made, although the hotter weather may, to some slight extent, lower the resistance of the rats at times This agrees with the conclusion of Morrell and Chapman (2) that while the susceptibility of a rat colony seems to vary from time to time this variation is not related to the season of the year

At the same time an examination of the curves for kidney damage in the surviving rats shows that the percentage varies quite closely with the percentage of rats surviving However, as would be expected, the per cent of kidney damage is greater than the percentage of deaths This is to be anticipated because of the high dosage level In only three instances is the per cent of kidney damage less than the percentage of deaths

The results obtained at the other and higher dosage of B mg per Kg are not as uniform as those obtained at A mg per Kg Out of 1595 rats injected 1124 or 70% survived, but in 12 of the 36 months the percentage of survivors was below the average for the entire period These drops below the normal occurred in

January of all 3 years	June of the 2nd year
February of the 2nd year	July of the 2nd year
March of the 1st and 2nd years	August of the 1st year
May of the 2nd year	September of the 1st and 2nd years

In these the average falls below normal five times during the months from June to September, and six times during the months from December to March This confirms the conclusion that variations in rat resistance are apparently independent of the season of the year It may, however, be significant that at both dosage levels the percentage of survivors is below normal only twice during the months of mild weather, namely, October, November, April and May The variations in the percentage of survivals, especially at the lower dosage, are not large enough, however, to justify the conclusion that this is really a seasonal variation

The fluctuations in the survival curve are much greater at B mg per Kg than at A mg per Kg due, of course, to the fact that the dosage is much nearer the Maximum Tolerated Dose Here again the curve for kidney damage parallels the survival curve closely, the extent of damage is greater than the percentage of deaths except in 9 of the 36 months There are greater variations in the relation between the percentage of survivals and the extent of kidney damage at B mg per Kg than at A mg per Kg due to the fact that the dosage B is materially larger than A

It is interesting to compare the yearly survival percentages at the two dosage levels

	Per Cent Survivals			
	A Mg /Kg		B Mg /Kg	
	Average.	Limits	Average	Limits
First year	89 2	84–100		
Second year	85 8	76–100	65 4	39–86
Third year	86 5	72–100	64 1	27–100
Fourth year	86 7	79–100	80 9	67–92

These figures show that even when neoarsphenamine gives a high percentage of survivals at a dosage level at which deaths occur, the use of still higher doses enables one to demonstrate differences in toxicity in batches which give practically identical results at the lower dose Thus, the testing at A mg /Kg during the second, third and fourth years shows that at this dose about 13% of the rats died and the fluctuations were all of about the same order whereas the testing at the higher dose showed a much lower per cent of deaths for the fourth year than for the second and third

The toxicity tests were carried out in the Biological Laboratories of E R Squibb and Sons, at New Brunswick, N J

REFERENCES

(1) Durham, Gaddum and Marchal, Spec Report, Ser No 128 (1929), Med Res Council London, England

(2) Morrell and Chapman, *J Pharmacol*, 48 (1933), 391

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES,
E R SQUIBB AND SONS, BROOKLYN, N Y

FREE ALKALI IN GLASS *

BY L F GABEL

It is obvious that glass bottles and ampuls of high soluble alkali content are unfit for use in finely adjusted pharmaceutical and chemical solutions

The following experiment demonstrates the possible reactions resulting from glass of high soluble alkali content A benzoic acid solution in an ordinary glass bottle is heated sufficiently to volatilize traces of benzoic acid in the neck of the bottle The sealed bottle is permitted to stand several months and upon testing, the traces of volatilized benzoic acid will be converted to the sodium salt

In the days before the advent of facilities to measure alkali and acids in minute amounts by the potential hydrogen apparatus, the soluble alkali in glass was determined by heating accurately measured amounts of $N/20$ HCl in the glass on test Titrating the excess of $N/20$ HCl with $N/20$ NaOH (Phenolphthalein T S) and calculating the free alkali in the glass from the amount of $N/20$ HCl reacting with the free sodium in the glass

For the past seven years we have used the following method for determining the amount of free alkali in glass

---

* Scientific Section A PH A Washington meeting, 1934

Boil fresh distilled water to one third the original volume Allow to cool sufficiently to permit the colorimetric determination of p_H, using Methyl Red p_H indicator The water, with the carbon dioxide excluded, has a p_H of about 5 6

Immediately fill the ampuls with the water, seal, immerse in water and place on steam-bath (approximately 80° to 90° C) for 16 consecutive hours The contents of the ampuls are then tested with Brom Thymol Blue p_H indicator, or Cresol Red, and the increase of p_H noted The increase in p_H is used as the basis for comparing different stocks of glass for soluble alkali

Bottles are tested in like manner with the exception that the bottles remain uncorked during the heat test and are submerged up to the neck in hot water A layer of liquid petrolatum on the surface of the water-bath prevents evaporation of the bath

The following data is an example of a test run of ampuls and bottles by the above procedure

TABLE I

Glass Sample.	Original p_H of Boiled Distilled Water	p_H of Water after 16 Hrs at 80° C.	Average Increase in p_H	Glass Sample.	Original p_H of Boiled Distilled Water	p_H of Water after 16 Hrs at 80° C	Average Increase in p_H
27	5 5	6 3–6 3–6 4	0 82	Bottles	5 4	6 5	1 28
Ampuls	5 5	6 5–6 4–6 2		Lot No 1	5 4	6 7	
Lot ' A"	5 5	7 2–7 6–6 6			5 4	6 6	
	5 5	6 5–6 2–6 3			5 4	7 0	
	5 5	6 2–6 1–6 2			5 4	6 7	
	5 5	6 6–6 8–6 5			5 4	6 8	
	5 5	6 1–6 6–6 1			5 4	6 5	
	5 5	6 2–6 0–6 0			5 4	6 5	
	5 5	6 1–6 1–6 2					
27	5 5	6 6–6 6–6 6	1 26	Bottles	5 4	7 5	2 1
Ampuls	5 5	6 9–6 4–6 4		Lot No 2	5 4	7 4	
Lot ' B"	5 5	6 8–6 9–7 0			5 4	7 6	
	5 5	7 0–7 2–7 0			5 4	7 6	
	5 5	7 0–7 2–6 9			5 4	7 6	
	5 5	6 6–7 0–6 5			5 4	7 5	
	5 5	6 8–6 6–6 0			5 4	7 4	
	5 5	6 7–6 9–6 6			5 4	7 4	
	5 5	7 2–6 7–6 9					

In the above table, ampuls labeled lot "A" are superior to lot "B" in regard to free alkali content, as the average ampul in lot "A" contained less soluble alkali than in lot "B "

The results obtained by this method are purely comparative but are sufficient to base a judgment on the glass in question, as standard stock samples can be tested at the same time and under the exact conditions as the submitted samples

Methyl Red and Brom Thymol Blue p_H indicators are acid in reaction, and as there is no buffer action in distilled water, the p_H obtained would be influenced by the slight acidity of the indicator

In the following experiments, neutralized indicators were used to arrive at a more accurate determination of increase in p_H due to the soluble alkali in glass

You will note that in the case of the neutral indicator, the p_H of the original water was 6 9 and the gain in p_H was 0 5 In the acid indicator the water was 5 6 p_H and the gain in p_H was 0 6

In order to use the neutralized indicators it would require more work, involving

TABLE II

Ampuls Same Stock	Acid Indicator p_H of Original Water	p_H after Heat Treatment	Gain in p_H
No 1	5 6	6 2	0 6
2	5 6	6 3	0 7
3	5 6	6 2	0 6
	Neutral Indicator		
No 4	6 9	7 4	0 5
5	6 9	7 4	0 5
6	6 9	7 5	0 6

the use of buffer solutions, whereas the acid indicators simplify the p_H determinations with the use of the Hellige Comparator

A series of experiments was made to note the results in regulating the original p_H of water used in the bottles and ampuls on test

Fresh distilled water of 5 5 p_H was used in one set of 2-oz flint glass bottles, to another set, water of 6 0 p_H was added, and another, 6 9 p_H, also, 7 2 p_H We prepared water of p_H 4 5 in one experiment These varying p_H's were obtained by adding alkali to the water to increase, and acid to decrease the p_H

Bottles Same Stock	Original p_H of Water	p_H After Heat Test	Gain in p_H
No 1	4 5	7 6	
	4 5	7 2	2 9
	4 5	7 4	
No 2	5 5	8 5	
	5 5	8 5	3 0
	5 5	8 5	
No 3	6 0	8 9	
	6 0	8 8	2 9
	6 0	9 0	
No 4	6 9	8 8	
	6 9	8 8	1 9
	6 9	8 8	
No 5	7 2	9 0	
	7 2	8 9	1 7
	7 2	8 9	

We also ran a series of ampuls in similar manner (with varying p_H)

Ampuls Same Stock	Original p_H	p_H After Heat Test	Gain in p_H
No 1	5 4	5 9	
		5 9	0 5
		5 9	
No 2	6 4	6 7	
		6 9	
		6 7	0 4
		6 8	
No 3	7 6	8 2	
		8 1	
		8 1	0 6
		8 3	

In the preceding series of tests on ampuls, very slight differences in free alkali were observed The results would indicate that regardless of the initial p_H, the final results are practically identical We are dealing, in the case of ampuls, with very slight amounts of alkali

An analysis of the series of tests on bottles reveals that regardless of the initial p_H, up to 6 0, the gain in p_H is similar When the original p_H of water is adjusted to 7 0, the increase in p_H upon applying the heat test is but 60% of that obtained with original water at 5 5 p_H

The length of time of the heat test used in our procedure is too severe, as will be shown by the following observation

Bottles of the same stock were completely filled with water of known p_H The sealed bottles were permitted to stand at room temperature for one year The gain in p_H in one year at room temperature was but 0 5 Ordinary glass bottles increase the p_H of water 3 0 after 16 hours at 80–90° C

SUMMARY

This paper was written with the object in mind of drawing attention to the necessity of the establishment of a standard method of determining the free alkali in glass

In our work we attempted to obtain purely relative results in order to make fair comparisons of glass

A standardized method should be established only for glass bottles and ampuls that are used for finely adjusted pharmaceutical and chemical solutions

ANALYTICAL DEPARTMENT,
PARKE, DAVIS & CO

A NOTE ON THE U S P MONOGRAPH ON CHRYSAROBIN * [1]

BY JOHN H GARDNER

For several years past, there has been an investigation in progress in this laboratory on the constituents of the anthracene drugs In the early part of this work, it was shown that the acetate of chrysophanic acid-9-anthranol can be isolated from demethylated and acetylated chrysarobin (1), indicating that chrysophanic acid-9 anthrone is a constituent of the drug On repeating this work with several samples of chrysarobin, it was found that the yields were extremely variable, ranging from nearly zero to about fifty per cent of the weight of the drug taken In attempting to trace the cause of this variation, all of the samples were subjected to the tests for identity given in the U S P monograph on chrysarobin For comparison, similar tests were made on pure chrysophanic acid and on pure, synthetic chrysophanic acid-9 anthrone The results of these tests are given in Table I

---

* From the Chemical Laboratory of Washington University, St Louis This investigation was made possible by a grant from the fund given by the Rockefeller Foundation to Washington University for research in science

[1] Scientific Section A PH A, Washington meeting, 1934

TABLE I

Reagent	U S P	Chrysarobin	Chrysophanic Acid	9 Anthrone
5% NaOH	Deep red	Red	Red	Pink
Concd H_2SO_4	Deep red	Brownish red	Cherry red	Yellow
Fuming HNO_3	Red brown	Red brown	Yellow	Light brown
$+NH_4OH$	Violet red	Brownish red + precipitate	Violet	Brown

It will be noted that in two of the four cases the results with chrysarobin differ decidedly with the tests given by the U S P, that is, with concentrated sulphuric acid and on treating the fuming nitric acid solution with ammonia In the latter case, the monograph also states that chrysophanic acid gives a yellow color with those reagents The production of a violet color was checked using chrysophanic acid from three sources, one sample from chrysarobin and two synthetic The colors obtained with five samples of chrysarobin from as many different dealers gave the same colors, with the exception that a few samples showed some bluish green fluorescence in sodium hydroxide solution

These results can only lead to one conclusion, that the tests for identity for chrysarobin given in the U S P are incorrect and in need of revision No data are as yet at hand to justify any positive suggestions

REFERENCE

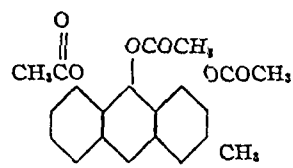
(1) Naylor and Gardner, *J Am Chem Soc*, 53 (1931), 4114

THE PREPARATION OF CHRYSOPHANIC ACID FROM CHRYSAROBIN *[1]

BY JOHN H GARDNER

In the course of our studies on the chemistry of the natural purgatives it has become necessary to find a source from which chrysophanic acid can be readily obtained Since chrysarobin is made up almost entirely of derivatives of chrysophanic acid and of emodin monomethyl ether, it seemed a logical material to investigate

Several years ago, the author and Naylor (1) found that by demethylating chrysarobin with hydrobromic acid and acetylating the product, a mixture was formed from which chrysophanic acid-9-anthranol triacetate (Formula I) could be readily separated by fractional crystallization Chrysophanic acid can be readily



I

* From the Chemical Laboratory of Washington University, St Louis This investigation was made possible by a grant from the fund given by the Rockefeller Foundation to Washington University for research in science

[1] Scientific Section, A PH A, Washington meeting, 1934

prepared from this material, as will be shown in the Experimental Part Unfortunately, on repeating the preparation of the anthranol triacetate using a number of samples of chrysarobin from various sources, the yields were found to be irregular and usually poor Consequently, this method does not meet our requirements

Hauser (2) found that chrysarobin contains a substance, ararobinol, probably a dianthrone derived from chrysophanic acid, which upon reduction yields chrysophanic acid-9-anthrone Consequently, a new procedure was tried Chrysarobin was first reduced with tin and hydrochloric acid with or without stannous chloride and then subjected the product to the same procedure as before Using five different samples of chrysarobin, the anthranol triacetate was obtained in yields of 15 to 35% of the weight of chrysarobin taken It was easily purified by crystallization from glacial acetic acid

For the preparation of chrysophanic acid, the anthranol triacetate was oxidized with chromic acid to diacetyl chrysophanic acid and that hydrolyzed to chrysophanic acid It was found that unless the anthranol triacetate was quite pure, it was virtually impossible to obtain the subsequent products in good states of purity

EXPERIMENTAL

Preparation of Chrysophanic Acid-9 Anthranol Triacetate —A —To a solution of 5 Gm of chrysarobin in 200 cc of boiling glacial acetic acid there were added 15 Gm of 200 mesh tin and then, during three and one half hours 65 cc of concd hydrochloric acid Boiling was continued another three and one half hours The mixture was then cooled and diluted with water until no more precipitate was formed The mixture was filtered the reduced chrysarobin being floated away from the residual tin The crude product was sucked as dry as possible on the filter and was used without further purification

The reduced chrysarobin was boiled under reflux with 75 cc of glacial acetic acid and 75 cc of 48% hydrobromic acid for fifteen hours After cooling, the mixture was filtered and the residue dried at room temperature

The dried residue was mixed with 5 Gm of anhydrous sodium acetate and 55 cc of acetic anhydride The mixture was boiled one hour and poured onto ice After standing 24 hours with occasional stirring, the residue was filtered out and dried at room temperature It was then boiled with about 200 cc of glacial acetic acid, cooled stirred and filtered The residue was washed with glacial acetic acid until the washings were almost colorless Yield, 0 75 to 1 25 Gm , m p 228–235°

B —A mixture of 25 Gm of chrysarobin 100 Gm of stannous chloride 75 Gm of 20-mesh granulated tin and 1000 cc of glacial acetic acid was boiled under a reflux condenser with mechanical stirring for four hours During the first two and one half hours, 400 cc of concentrated hydrochloric acid was added in small portions The mixture was cooled and filtered, the reduced chrysarobin being floated away from the remaining tin

The reduced chrysarobin was demethylated and acetylated as before using proportionate amounts of the various reagents Yield of chrysophanic acid 9 anthranol triacetate, 8 5 Gm after two acetic acid treatments m p 238–241° (corr) with decomposition McDonnell and Gardner (3) give m p 239 6–240°

Diacetyl Chrysophanic Acid —To a solution of 8 5 Gm of chrysophanic acid 9 anthranol triacetate in 350 cc of hot glacial acetic acid there were added 3 Gm of chromic acid in a little water and acetic acid, in portions The mixture was heated nearly to boiling for fifteen minutes A small amount of insoluble tar was removed by hand The mixture was diluted to 1 liter with water and allowed to stand over night The product was filtered out and washed with water Yield 7 Gm (89.2%), m p 205–206° (corr) from alcohol Siegrist (4) gives m p 208–209° Beal and Gunton (5) give m p 204°

Chrysophanic Acid —Five grams of diacetyl chrysophanic acid were partly dissolved and partly suspended in 600 cc of boiling ethyl alcohol A solution of 3 Gm of potassium hydroxide in a little water was added and the mixture boiled three hours, after which 10 cc of concentrated

hydrochloric acid was added and the mixture allowed to stand over night The precipitate which formed was filtered out It was found to be a mixture of chrysophanic acid and potassium chloride It was therefore boiled with water and the chrysophanic acid filtered out Yield 3 5 Gm (95 8%), m p 193–194° (corr) Naylor and Gardner (1) give m p 195 6–196 2° Other investigators report slightly lower values

SUMMARY

A satisfactory method for the preparation of chrysophanic acid from chrysaro bin has been developed

REFERENCES

(1) Naylor and Gardner, *J Am Chem Soc*, 53 (1931), 4114
(2) Hauser, Dissertation, Zurich, 1924
(3) McDonnell and Gardner, *J Am Chem Soc*, 56 (1934) 1246
(4) Siegrist, Dissertation Basel (1932), 49
(5) Beal and Gunton JOUR A PH A 11 (1922), 681

THE BIOASSAY OF SQUILL *[1]

BY HARRY ROSEN

Squill, a member of the heart stimulant or digitalis group of drugs is biologically assayed by the same methods as the other members of this so-called "Digitalis series"

Many test animals and methods of procedure have been proposed and employed for bioassay and standardization purposes Consequently a wide divergence of opinion concerning the relative merits of the respective procedures is found

Hale (1) (2), after working with the various methods of assay, concluded that they did not give proportional results and suggested that the one hour frog procedure was probably the most suitable

The American Drug Manufacturers' Association (3) undertook collaborative investigations of the various assay methods and concluded that the M L D frog and M L D guinea pig methods were more accurate than the one hour frog or cat methods and that the technique involved was much simpler

Richaud (4), studying the various methods for the assay of cardiac tonics, concluded that the guinea pig method was unsuitable for the assay of these drugs

Eckler (5) assayed a series of preparations by the cat, guinea pig and one hour frog methods He concluded that the cat method was complicated, time consuming, costly and gave results varying from 33 to 123 per cent

Rowntree and Macht (6) concluded that the cat method was more reliable than the frog method Van Leeuwen, den Besten and van Wijngaarden (7), (8), (9) reported that the cat method was more accurate and was independent of seasonal variations as compared with the frog methods

Wible (10) concluded that the cat and the one hour frog methods agree within the limits of biological error

---

* Scientific Section, A PH A Washington meeting, 1934

[1] From the laboratory of Marvin R Thompson Professor of Pharmacology School of Pharmacy, University of Maryland Compiled in part from a thesis submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfilment of the requirements for the degree of Master of Science June 1933

Burn (11) stated that the results obtained by assaying Tr of Squill, in terms of ouabain by the cat method differed significantly from the results obtained by the frog method The assay in terms of scillaren gave the same results whether performed on the cat, frog or rabbit auricle

Rowe (12) in an early report stated he preferred the M L D frog to the cat method but believed he did not work with enough cats In a later paper (13) he reported that the hour frog, M. L D frog and cat methods were inapplicable while the guinea pig could be used but is too expensive

Conflicting reports concerning the M L D of squill for the various animals are also found in the literature Eggleston (14) stated that he found for the cat M L D, 525 545 595 and 642 mg per Kg, while Rowe (12) gave the value as 112 mg per Kg for one highly active sample of fluidextract Pittenger, in his 'Biologic Assays" (15), gives 575 mg per Kg as the M L D

Vanderkleed (16) reported that season was of no direct significance in the guinea pig method of assay, while Haskell (17) disagreed with this statement since he had figures to show that during eight months, the original M L D was at times doubled due to seasonal variation Pittenger (15) stated the M L D for guinea pigs is 0 0025 cc Tr or 0 00025 cc Fluidextract of Squill

Presentation of many other citations of the literature would only serve to illustrate further disagreements

The U S P X "one-hour frog," the "over night or mortality curve frog," "intravenous cat" and "subcutaneous guinea pig" methods have received the most impressive support

It may thus be seen that many workers have subjected these and other methods to comparative study, and the evidence so obtained has resulted in conflicting opinions of such a magnitude as to cause some workers to roundly condemn certain of the methods and to praise others It is worthy of note, however, that no one method has proved to be sufficiently superior to clearly establish universal preference for that method Advantages and disadvantages are to be found in each, but the main reason for the preference of a given worker for a given method is usually to be found in his belief that the different methods yield significantly different results for a given squill preparation, and that the "preferred" method yields the results of greatest reliability and accuracy

Because the four methods mentioned have been found to be possessive of merit in this laboratory, a comparative study involving these four methods was undertaken with a view toward establishing if possible, whether or not the respective methods actually do yield conflicting results, and if so, to ascertain the character of the discrepancies

METHODS

One-Hour Frog Method—The procedure for this method was carried out as directed in the official U S P X assay (18) The suitability of ouabain as a standard for substances, other than those of the strophanthus family is one of the doubtful points of the one-hour frog assay for squill Burn (11) believes that it is not satisfactory and recommends a squill preparation as a standard The standards used in this study were ouabain and scillaren A It had been planned to also use scillaren B but this idea, as will be explained later, was abandoned

Over Night Frog Method—The Chapman and Morrell (19) modification of the Trevan (20) mortality curve method was used in the over night frog assays Although the curve of Chapman and Morrell was prepared for digitalis and strophanthus assays, it was used here and the results compared to those of the other methods Both ouabain and scillaren A were used here also as standards

The Intravenous Cat Method —The conventional intravenous method was used for this work with the exception that 30–45 minutes was strictly adhered to as a time limit in which the death of the animal was to occur A further exception was that a dose of 6–10 cc per Kg was the range allowed for injection into the cat Five cats, if giving consistent results, were used for each assay If the results showed great variations, more cats were used, until consistent results were obtained

All cat results were calculated in terms of ouabain and scillaren A This necessitated the determination of the cat M L D for ouabain and scillaren A, and the seasonal effect on the susceptibility of the cat to these standards These studies afforded an opportune time to observe the stability of scillaren A solutions as preserved in this laboratory This was not necessary for ouabain, since it had been determined before this work was begun, that ouabain solutions as preserved in this laboratory are very stable

Subcutaneous Guinea Pig Method —This method was used as developed by Reed and Vanderkleed (21) Six hours was the time limit originally planned for this method, but could not be adhered to, as will be explained later Results were calculated in terms of ouabain and scillaren A

EXPERIMENTAL

TABLE I —SHOWING M L D OF OUABAIN, SCILLAREN A AND SCILLAREN B, SEASONAL VARIATIONS OF CAT SUSCEPTIBILITY TO OUABAIN AND SCILLAREN A, AND STABILITY OF THE SCILLAREN A SOLUTIONS

Solution	Date of Test	Number of Cats	M L D in Mg	Standard Deviation
Ouabain sol of 6-22-32	6-(23-30)-32	20	0 1111	±0 0162
Ouabain sol of 6-22-32	10-14-32	6	0 1059	±0 0192
Ouabain sol of 6-22-32	12-2-32	5	0 1139	±0 0168
Ouabain sol of 6-22-32	3-13-33	5	0 1052	±0 0126
Scillaren A sol of 7-5-32	7-(5-14)-32	20	0 2185	±0 0314
Scillaren A sol of 9-26-32	9-26-32	5	0 2104	±0 0256
Scillaren A sol of 9-26-32	11-29-32	5	0 2161	±0 0435
Scillaren A sol of 9-26-32	3-14-33	5	0 1749	±0 0344
Scillaren A sol of 9-26-32	4-24-33	5	0 2300	±0 0331
Scillaren A sol of 2-23-33	2-23-33	5	0 2108	±0 0158
Scillaren A sol of 5-2-33	5-2-33	5	0 2043	±0 0276
Scillaren B sol of 7-5-32	7-(14-19)-32	12		
Scillaren B sol of 7-5-32	8-4-32	6		

DISCUSSION

Table I shows the M L D of ouabain per Kg of cat to be 0 1111 mg and that of scillaren A to be 0 2185 per Kg The values for scillaren B with 12 cats varied from 0 05987 to 0 1511 mg per Kg Repeated with six cats, the figures ranged from 0 08277 to 0 1865 mg per Kg Due to this great variation in results of the individual cats, no conclusions as to the M L D could be made For this reason, all further work planned with scillaren B as a standard was abandoned

Cats show no seasonal variation in susceptibility to either ouabain or scillaren A

Scillaren A solutions as preserved in this laboratory are stable for about three months It is proved that the change in M L D after this time is due to decomposition and not seasonal variation, by the fact that a while previous to this test, a new solution gave results, which were the same as the original M L D

As stated before, other workers in this laboratory proved that ouabain solutions as preserved are very stable

Table II shows that the one-hour frog, over night frog and cat methods give results in good agreement within the limits of experimental error Much of the disagreement shown by other workers is most likely due to the fact that they obtained results in cat units and not in terms of a standard Cat units vary in different laboratories due to differences in type and depth of anesthesia, modifications in technique, environment and diet of the cats For this reason, cat units established by any one laboratory cannot be used universally, while a standard of comparison can Results should be expressed in terms of a standard substance, regardless of what assay method is used

The guinea pig method shows agreement with the other methods within the limits of experimental error in about 60 to 70% of the assays Variation in guinea pig susceptibility is found in this laboratory to occur only when the source of supply or diet of the animals is changed So long as they are obtained from one source and kept on one diet, they show no variations The reason for the disagreement of some of the guinea pig results is thought to be due to the great variation in susceptibility of the individual animals and not due to so-called seasonal variation

The six-hour limit for the occurrence of death in the guinea pigs was altered to an over night time limit Absorption was very variable in the individual animals, and it was thought that the longer period of observation would overcome this difficulty

From the standpoint of accuracy and routine dependability in assaying squill preparations, and also taking the matter of time and expense into consideration, the results of this investigation have convinced the author as well as the other workers in this laboratory that the over night frog method is definitely superior to any of the other methods employed

For those workers having an adequate supply of suitable cats the cat method is thoroughly reliable, though somewhat less accurate than the over night frog method, provided that the "cat unit" idea is abandoned and samples are assayed in terms of ouabain or scillaren A as in the frog methods

The one-hour frog method requires much experience in order to eliminate the sources of error The assayist lacking thorough experience cannot hope to obtain consistently accurate results For this reason, either the over night frog or cat methods are distinctly preferable

The time and expense necessary before results can be obtained by the guinea pig method is not justified by the results The other methods require no more time, in fact two of them require much less time before results are known and all of them are more accurate

CONCLUSIONS

(1) The one-hour frog, over night frog and intravenous cat methods of assay for squill give results in agreement within the limits of experimental error provided the results are expressed in terms of an appropriate standard The guinea pig method gives the same results in 60–70% of the assays

(2) Ouabain is a satisfactory standard for squill since scillaren A, a squill body, showed no advantages

(3) The over night frog, intravenous cat and one-hour frog methods are most suitable in the order indicated The guinea pig method is not as reliable

TABLE II —A COMPOSITE TABLE OF ALL ASSAY RESULTS EXPRESSED IN TERMS OF MILLIGRAMS OF OUABAIN AND SCILLAREN A TO WHICH EACH CC. OF PREPARATION IS EQUIVALENT

Results—Summer 1932

Preparation	Cat. Ou[1]	Cat. A[2]	One Hour Frog Ou[1]	One Hour Frog A[2]	Over Night Frog Ou[1]	Over Night Frog A[2]	Guinea Pig Ou[1]	Guinea Pig A[2]
F E Squill	0 8881	1 7467					1 2000	2 8000
P T No 180	±0 1000	±0 1964						
F E Squill	1 1236	2 2097					1 000	2 3333
P T No 82	±0 1345	±0 2646						
F E Squill	0 3656	0 7191						
P T No 233	±0 0389	±0 0765						
Tr Squill	0 0745	0 1466						
H R No 1	±0 *0050*	±0 *0099*						
Tr Squill	0 0652	0 1283						
H R No 2	±0 0039	±0 0076						
F E Squill								
P T No 283								
F E Squill	0 6386	1 2559	0 6249				1 1579	2 7019
P T No 198	±0 *0704*	±0 1385						

Results—Winter 1932–1933

Preparation	Cat Ou[1]	Cat A[2]	One Hour Frog Ou[1]	One Hour Frog A[2]	Over Night Frog Ou[1]	Over Night Frog A[2]	Guinea Pig Ou[1]	Guinea Pig A[2]
F E Squill	0 9039	1 7777	0 8000	1 4000				
P T No 180	±0 0674	±0 1326						
F E Squill								
P T No 82								
F E Squill								
P T No 233								
Tr Squill	0 0602	0 1185	0 0666	*0 1166*	*0 0500*	*0 1252*	0 0499	0 1166
H R No 1	±0 0030	±0 0059						
Tr Squill								
H R No 2								
F E Squill	1 2318	2 4226	1 6000	2 8000	1 1966	3 0000	2 1423	4 9887
P T No 283	±0 0179	±0 0179						
F E Squill	0 7494	1 4738	0 6666	1 6666			0 8571	2 000
P T No 198	±0 0581	±0 1143						

Results—Spring 1934

Preparation	Cat Ou[1]	Cat A[2]	One Hour Frog Ou[1]	One Hour Frog A[2]	Over Night Frog Ou[1]	Over Night Frog A[2]	Guinea Pig Ou[1]	Guinea Pig A[2]
F E Squill								
P T No 180								
F E Squill	0 5666	1 7143	0 5833		0 4062			
P T No 82	±0 0889	±0 1748						
F E Squill								
P T No 233								
Tr Squill	0 0422	0 0830	0 0350		0 0_06			
H R No 1	±0 0056	±0 0109						
Tr Squill	0 0211	0 0415	0 0175		0 0160			
H R No 2	±0 0033	±0 0065						
F E Squill	1 1666	2 2942	1 000		0 ~~7~			
P T No 283	±0 1111	±0 2185						
F E Squill								
P T No 198								

Ou[1] = Ouabain A[2] = Scillaren A

Results—Autumn 1932

Cat. Ou[1]	Cat. A	One Hour Frog Ou[1]	One Hour Frog A[2]	Over Night Frog Ou[1]	Over Night Frog A[2]	Guinea Pig Ou[1]	Guinea Pig A[2]
0 9121	1 7939	0 5833	0 1000			1 000	2 3333
±0 *0454*	±0 0894						
0 7834	1 5446	0 7777	1 3333			1 2000	2 8000
±0 0869	±0 1702						
0 3615	*0 6910*	0 5000	0 6667			0 6000	1 4000
±0 0513	±0 1009						
0 0563	0 1108	0 0750	0 1000			0 0600	0 1400
±0 0057	±0 0112						
0 0586	0 1153	0 0750	0 1000			0 0600	0 1400
±0 009_	±0 0180						
0 7125	1 4012	0 6000	1 4000			0 8571	1 9999
±0 0928	±0 1824						

Results—Spring 1933

Cat Ou[1]	Cat A[2]	One Hour Frog Ou[1]	One Hour Frog A[2]	Over Night Frog Ou[1]	Over Night Frog A[2]	Guinea Pig Ou[1]	Guinea Pig A[2]
0 7373	1 4499	0 7143	1 7142	0 6725	1 7800	1 0000	2 3333
±1 004	±0 1975						
0 3393	0 6684	0 3572	0 8572	0 2988	0 8188	0 3333	0 7777
±0 0355	±0 0699						
0 0528	0 1038	0 0417	1 000	0 0 36	0 0921	0 0375	0 0875
±0 0152	±0 0298						

(4) Official squill preparations retain over half of their activity for a period of one year

(5) The simple determination of the M L D of a squill preparation by the well-known cat method does not yield a reliable indication of potency The M L D of a standard substance, such as ouabain or scillaren A, must be determined by the identical technique used for the sample, and the results expressed in terms of the standard instead of "cat units"

BIBLIOGRAPHY

(1) Hale, Proc A Ph A 57 (1909) 768–773
(2) Hale, *J P E T*, 3 (1911) 458–459
(3) Pittenger, *Proc A D M A* (1923) 204–209
(4) Richaud, *Arch intern pharmacodyn Ther* 24 (1914), 225–272
(5) Eckler, Jour A Ph A 1 (1912), 715–724
(6) Rowntree and Macht, *J A M A*, 66 (1916), 970–971
(7) van Leeuwen *Pharm Weekbl*, 54 (1917), 890–892, *C A*, 11 (1917), 2943
(8) van Leeuwen Abderhalden s Handbuch der biologischen Arbeitsmethoden' (1923) Abt IV, Teil 7, Heft 5 98
(9) den Besten and van Wijngaarden *Nederl Tijdschr Geneesk* 2 (1917) 478, Jour A Ph A 7 (1918), 1000
(10) Wible *A J P* 98 (1928) 396–401
(11) Burn, *Pharm J* 118 (1927) 328–329
(12) Rowe, Jour A Ph A 8 (1919) 900
(13) Rowe, *Ibid* 17 (1928), 645
(14) Eggleston, *A J P* 85 (1913), 99–122
(15) Pittenger Biologic Assays,' second edition
(16) Vanderkleed Jour A Ph A, 1 (1912), 701–708
(17) Haskell, 4 *J P*, 84 (1912) 241–246
(18) U S P X, pages 393–394
(19) Chapman and Morrell *J P E T*, 46 (1932), 229
(20) Trevan, *Pharm J* 117 (1926), 439
(21) Reed and Vanderkleed, *A J P* 80 (1908), 110–128

Foot note The Sandoz Chemical Works very kindly supplied the scillaren A and B used in this work

SALIVA TESTS II HEROIN

BY JAMES C MUNCH *

Success in using the mouse test for the detection of morphine (1) suggested the possibility of employing it for the detection of heroin in the saliva of horses and in pharmaceutical products (2) A standardized technique was developed for this saliva test (1)

A series of normal mice, weighing approximately 20 Gm, were injected subcutaneously with heroin, and various symptoms observed over a period of half an hour In general, the *S*-tail curve resembles that produced by morphine Literature reports (2) indicate that morphine and heroin are equally potent, threshold doses being stated to be 10 gamma per 20-Gm mouse, or 0 5 mg per Kg We found the threshold dose of heroin to be much smaller (Table I) In addition to the tail curve, mice injected with heroin showed a series of symptoms differing from those following the administration of morphine The mice tended to become much more restless, and hyper irritable A common heroin symptom was the

* Sharp and Dohme, Glen Olden, Penna

development of a definite running reflex Very shortly after the injection of an effective dose, mice tended to go to the periphery of their cages, and start an endless parade round and round from right to left, or vice versa If two injected mice were placed in the same cage, but facing in opposite directions, they developed a traffic code, on meeting, one mouse consistently swerved to the right, the other to the left

Heroin was injected subcutaneously into horses Definite evidence of stimulation was observed by a veterinarian after 32 5 mg per horse The injection of 16 mg per horse, or one-half the previous dose, failed to affect the horse so far as the verterinarian could determine The mouse test on samples of saliva was positive with each dose (Table II) The horse receiving 16 mg was also bled thirty minutes after injection The blood was allowed to clot and tests conducted upon the serum No effect was observed on mice, following the injection of 1 cc of serum, 2 cc uniformly produced a positive tail-curve

TABLE I —MOUSE-TAIL RESPONSES AFTER INJECTION OF HEROIN

Dose Mg /Kg	Per Cent Mice Showing Positive Reaction
0 025	0
0 04	25
0 05	100
0 0625	100
0 07	100

TABLE II —DETECTION OF INJECTED HEROIN IN HORSE'S SALIVA

Horse No	Weight	Heroin Injected Mg /Horse	Heroin Injected Gamma/Kg	Veterinary Deductions	Mouse Test. Tail Curve	Mouse Test. Excitement
135	570	325	570	Stimulation	Positive	+ + +
9366	500	162 5	325	Stimulation	Positive	+ + +
135	570	65	115	Stimulation	Positive	+ +
135	570	32 5	57	Stimulation	Positive	+
135	570	16	28	Normal	Positive	0

The running reflex and the increased irritability appeared to differentiate heroin from morphine Heroin solutions in the saliva of untreated horses, in normal horse serum, and in distilled water, were identical in action Saliva collected from horses receiving 16 to 65 mg per horse gave a morphine, rather than a heroin type of response, suggesting that heroin is broken down to morphine in the body of the horse Following larger doses of heroin, positive mouse-tail tests were not observed until an hour after administration, and the effect persisted in salivas collected twenty-four hours afterward However, salivas collected after 15 and 30 minutes produced marked excitement, followed by depression This excitement and depression decreased in intensity with decreasing doses, and was not observed after the administration of 16 mg of heroin After the subcutaneous administration of heroin to horses, some substance is excreted in the saliva which produces effects upon mice similar to those produced by morphine

Mouse tests were made by direct intraperitoneal injection of a series of very old solutions of pharmaceuticals containing heroin, such as Linctus Compound, Syrup of Heroin Compound and Elixir of Glycerin and Heroin Compound The undiluted products produced typical tail-curves, restlessness and the running reflex of heroin, but convulsions developed, and the animals died within ten to thirty minutes Marked opacity of the pupils developed shortly before death

Dilute solutions produced typical tail-curves, marked depression rather than stimulation, and blindness

CONCLUSIONS

1 Physiological actions upon mice serve to detect heroin in saliva, as well as in pharmaceutical preparations

2 Heroin is more effective than morphine on mice

3 After administering heroin, the saliva of horses contains a substance giving a morphine reaction on mice

BIBLIOGRAPHY

(1) J C Munch 'Saliva Tests I Morphine,' Jour A Ph A, 27 (1934), 766–773
(2) J C Munch, Bioassays" Publ Williams and Wilkins 1931

Foot note The technical assistance of Harry J Pratt and Aaron B Sloane is gratefully acknowledged

---

DRUG EXTRACTION I A STUDY OF VARIOUS MENSTRUA FROM THE STANDPOINT OF SWELLING EFFECTS, PENETRATION AND EXTRACTION

BY WILLIAM J HUSA AND LOUIS MAGID

(*Concluded from page 1103 November Journal*)

EXTRACTION OF BELLADONNA ROOT OF DIFFERENT DEGREES OF FINENESS

Filtration Method—A technique was used by Husa and Fehder (14), whereby imbibition and extraction of powdered drugs could be determined in a process of maceration An outline of the method as applied to powdered belladonna root is as follows

Ten grams of powdered belladonna root were macerated for 15 minutes with 90 Gm of menstruum in a 250-cc Erlenmeyer flask in a thermostat at 30° C, during which time it was agitated every five minutes The mixture was then filtered and after allowing 15 minutes for completion of draining, the filtrate was weighed and the weight of the filter paper with the wet marc was also determined Similar macerations were made for periods of 1 hour, 5 hours and 24 hours, with less frequent agitation during the longer intervals

In the filtrate, the percentage of dissolved solids was determined by weighing exactly ten Gm of filtrate in a tared 50-cc beaker, evaporating to dryness on a water-bath and drying to constant weight in an oven at 105° C The filtrate was assayed for alkaloidal content according to the U S P X assay for Tincture of Belladonna except that 25 Gm of the filtrate were used The wet marc was also assayed for alkaloidal content according to Type Process B, designated for belladonna root by the U S P X

The amount of moisture in the powdered drug was determined by the U S P X method for drugs containing no constituents volatile at 100° C The amount of dry marc was calculated as follows (weight of drug taken for extraction) minus (weight of moisture in drug) minus (weight of dissolved solids in filtrate) = (weight of dry marc) The weight of the liquid imbibed by the marc was calculated as

follows (weight of wet filter paper + wet marc) minus (weight of filter paper and liquid imbibed by the filter paper) minus (weight of dry marc) = (weight of liquid imbibed by the marc) The loss of menstruum during the process was determined by comparing the total weight of the materials used with the combined weight of the filtrate and wet marc

Work has been carried out using exactly 10 00 Gm of powdered belladonna root of different degrees of fineness and exactly 90 00 Gm of an alcoholic menstruum consisting of a mixture of alcohol 5 vol —water 1 vol , this being the menstruum official in the U S P X for Fluidextract of Belladonna Root

TABLE XXV —EFFECT OF A MIXTURE OF ALCOHOL 5 VOL —WATER 1 VOL ON POWDERED BELLADONNA ROOT OF DIFFERENT DEGREES OF FINENESS

Period of Maceration	Liquid in Marc	Dry Marc.	Filtrate	Weight in Grams of Loss of Menstruum	Total Extractive.	Alkaloids in Filtrate.	Alkaloids in Marc.	Total.
a Belladonna Root in No 20 Powder, moisture content = 11 12 per cent								
15 min	21 4	7 81	68 2	1 0	1 09	0 028	0 015	0 043
1 hr	21 2	7 68	68 8	1 3	1 22	0 034	0 011	0 045
5 hrs	20 9	7 65	68 9	1 0	1 24	0 034	0 010	0 044
24 hrs	20 6	7 64	67 9	2 3	1 26	0 032	0 012	0 044
b Belladonna Root in No 40 Powder moisture content = 10 27 per cent								
15 min	19 7	7 63	70 0	1 1	1 35	0 037	0 013	0 050
1 hr	19 7	7 58	69 9	1 2	1 39	0 036	0 013	0 049
5 hrs	20 1	7 57	69 9	0 8	1 40	0 036	0 013	0 049
24 hrs	20 3	7 57	69 5	1 0	1 40	0 035	0 013	0 048
c Belladonna Root in No 60 Powder, moisture content = 8 10 per cent								
15 min	16 3	7 39	73 9	0 8	1 81	0 035	0 013	0 048
1 hr	16 1	7 37	74 1	0 8	1 82	0 037	0 012	0 049
5 hrs	15 8	7 39	74 1	1 1	1 81	0 036	0 013	0 049
24 hrs	16 0	7 33	74 1	0 9	1 86	0 036	0 013	0 049
d Belladonna Root in No 80 Powder, moisture content = 10 35 per cent								
15 min	18 4	7 37	71 9	0 7	1 60	0 036	0 009	0 045
1 hr	17 9	7 34	72 3	0 9	1 63	0 036	0 009	0 045
5 hrs	17 3	7 30	73 0	0 9	1 67	0 036	0 009	0 045
24 hrs	18 2	7 29	72 0	1 0	1 68	0 036	0 009	0 045

Using the official U S P X menstruum for the Fluidextract of Belladonna Root (mixture of alcohol 5 vol —water 1 vol) and belladonna root in No 20, 40, 60 and 80 powder, it is seen that imbibition is complete in each case in 15 minutes The relative amounts of liquid imbibed and the yield of total non-volatile extractive (listed as "total extractive" in the tables) by the different powders offer interesting comparisons

TABLE XXVI —EFFECT OF FINENESS OF POWDER OF BELLADONNA ROOT ON YIELD OF TOTAL EXTRACTIVE AND ON IMBIBITION USING MIXTURE OF ALCOHOL 5 VOL —WATER 1 VOL

Fineness of Powder	Grams of Solvent Imbibed by 10 Gm Drug		No Gm of Total Extractive from 10 Gm. Drug after 24 Hrs
	Maceration Method	Centrifuge Method	
No 20	21	21	1 26
No 40	20	17	1 40
No 60	16	15	1 86
No 80	18	16	1 68

In Table XXVI the figures under the centrifuge method represent the average of results after 60, 120, 360, 720 and 1440 minutes The data on imbibition by the centrifuge method were originally stated in terms of the number of cc of solvent imbibed by 1 Gm of drug, for the preceding table the results given in Table XXIII were recalculated on the basis of the number of Gm of solvent imbibed by 10 Gm of drug The results in Table XXVI indicate that with increasing fineness of powder, imbibition decreases until No 80 powder is reached where *there is an increase in imbibition* A hypothesis to explain this phenomena has already been given earlier in the paper

The amount of total extractive obtained from the filtrate in the maceration process offers the same anomaly as observed in imbibition The yield of total extractive increases with increasing fineness of powder down to and including the No 60 powder, but when the fineness is increased to a No 80 powder, the yield of extractive decreases By powdering the drug more finely more surface is exposed, giving the solvent more ready access to the constituents, and the slowly diffusible substances have greater opportunity to enter the solvent phase, these factors would account for the increased yield of extractive in passing from a No 20 to a No 40 and No 60 powder As the total surface of the particles increases, an opposing tendency would assume greater importance, *i e*, the tendency for the drug constituents to be adsorbed on the surfaces of the particles In the No 80 powder, it appears that the greater adsorptive power due to increased surface overcomes the advantage gained by greater accessibility of solvent so that the net result is a decrease in yield of total extractive as shown in Table XXVI

An examination of Table XXV indicates that the official menstruum extracts as much alkaloid in 15 minutes as in 24 hours in a maceration process with the No 40, 60 and 80 powders, but not with the No 20 powder, which gives a maximum yield of alkaloids after 1 hour Similar results have been obtained with a totally different drug, *i e*, jalap (14) These results throw considerable doubt on the wisdom of the long periods of maceration specified in many of the pharmacopœias of the world

Typical results such as those shown in Table XXV*c* indicate that 0 035 Gm of alkaloids is found in the filtrate while 0 013 Gm of alkaloids remains in the marc It is of interest to consider the state of the alkaloids in the marc Since 0 035 Gm of alkaloids is dissolved in 74 Gm of filtrate, a calculation shows that if the 16 Gm of menstruum remaining in the marc contained the same proportion of dissolved alkaloids, there would be 0 008 Gm of alkaloids thus existing in the dissolved state in the liquid imbibed in the marc This would leave 0 005 Gm of alkaloids remaining in the marc in some other form, this might be present in the undissolved form in the inner recesses of the drug particles or it might be present in a state of adsorption on the surfaces of the drug particles If the 0 005 Gm of alkaloids were so situated as to be only slowly accessible to the solvent, it would follow that the amount of alkaloids should gradually increase in the filtrate during the 24 hours, but as a matter of fact the same amount of alkaloids appears in the filtrate in 15 minutes as in 24 hours From these considerations it appears more likely that this proportion of alkaloids is adsorbed on the drug surfaces The only other explanation visualized at present is that this proportion of alkaloids is so inaccessible to the solvent that the latter has no effect on it, this explanation seems less likely

Centrifuge Method—A technique was devised for determining the rate of extraction of alkaloids and of total extractive on maceration with successive portions of menstruum, as well as the degree of imbibition at different stages of the extraction process In this method the centrifuge is used for separating the liquid from the drug In order to facilitate comparisons with the previous maceration experiments, the same quantities of drug and menstruum were employed, *i e*, 10 00 Gm of powdered drug and 90 00 Gm of menstruum Into each of four centrifuge tubes of 50 cc capacity were placed 2 50 Gm of powdered drug and 22 50 Gm of menstruum The contents of each tube were well mixed by means of a glass rod inserted through a cork stopper in the mouth of the tube The tubes were then placed in a thermostat at 30° C and allowed to remain there for 15 minutes, being well stirred every five minutes The tubes were then centrifuged for ten minutes, after which time the clear supernatant liquid was decanted, the liquids from the four tubes being mixed together in a closed container and weighed in order to determine the weight of macerate obtained from 10 00 Gm of powdered drug and 90 00 Gm of menstruum The tubes containing the wet marc were then weighed, and from this weight the amount of liquid imbibed in the marc was calculated For the next maceration, 22 50 Gm of menstruum were added to the wet marc in each tube, the mixture stirred well and placed in the thermostat and the same procedure followed as previously described Thus the amount of liquid imbibed in the marc after each maceration was determined, as well as the amount of macerate in each case Five macerates were obtained and each was assayed in duplicate for alkaloidal content and total extractive The total time elapsing from one maceration to the next was 55 minutes, this being kept constant throughout the procedure.

The results shown in the following tables were calculated as in the case of the filtration method, with the exception that the calculations were somewhat simpler due to the fact that corrections for the use of filter paper were eliminated, since filter paper was not used

TABLE XXVII—EFFECT OF A MIXTURE OF ALCOHOL 5 VOL—WATER 1 VOL ON POWDERED BELLADONNA ROOT OF DIFFERENT DEGREES OF FINENESS ON MACERATION WITH SUCCESSIVE PORTIONS OF SOLVENT

Maceration	Weight in Grams of Liquid in Marc	Dry Marc	Macerate	Loss of Menstruum	Total Extractive	Alkaloids
a Belladonna Root in No 20 Powder, moisture content = 11 12 per cent						
1st	19 8	7 70	72 0	0 5	1 19	0 032
2nd	21 0	7 14	89 0	0 3	0 56	0 008
3rd	21 0	6 89	89 9	0 4	0 25	0 003
4th	21 5	6 76	89 4	0 3	0 13	0 001
5th	21 6	6 69	89 5	0 4	0 07	0 001
Marc						0 002
					Total =	0 047
b Belladonna Root in No 40 Powder moisture content = 9 60 per cent						
1st	17 0	7 62	75 5	0 0	1 42	0 033
2nd	17 9	7 07	89 6	0 1	0 55	0 009
3rd	18 0	6 84	90 3	0 0	0 23	0 002
4th	18 3	6 72	89 9	0 0	0 12	0 000
5th	18 1	6 64	90 5	0 0	0 08	0 000
Marc						0 001
					Total =	0 045

c	Belladonna Root in No 60 Powder, moisture content = 8 10 per cent					
	1st	15 1	7 25	77 7	0 0	1 94	0 038
	2nd	15 3	6 62	90 3	0 1	0 63	0 007
	3rd	15 7	6 39	89 6	0 2	0 23	0 001
	4th	15 8	6 27	89 9	0 1	0 12	0 000
	5th	15 7	6 20	90 0	0 2	0 07	0 000
	Marc						0 000
						Total =	0 046
d	Belladonna Root in No 80 Powder, moisture content = 10 35 per cent					
	1st	16 1	7 22	76 7	0 1	1 75	0 038
	2nd	16 1	6 65	90 6	0 0	0 57	0 008
	3rd	16 4	6 44	90 0	0 0	0 21	0 001
	4th	16 2	6 34	90 5	0 0	0 10	0 000
	5th	16 3	6 28	90 1	0 0	0 06	0 000
	Marc						0 000
						Total =	0 047

The technique of maceration with successive portions of solvent throws light on just what is happening during percolation, as the drug repeatedly comes into contact with fresh solvent The process is, however, broken up into several steps, and it is thus possible to secure data which cannot be conveniently secured in the usual percolation process The loss of menstruum throughout the procedure is small, being at the greatest only 1 9 Gm in the handling of 450 0 Gm of menstruum

A study of Table XXVII shows that imbibition decreases until No 80 powder is reached where there is an increase in imbibition The yield of total extractive increases until No 80 powder is reached where there is a decrease These results are in accord with the data shown in Table XXVI

As the extractive matter is gradually removed there is a corresponding increase in imbibition, this increase from the first to the fifth macerate totals 1 8 Gm for the No 20 powder, 1 1 Gm for the No 40 powder, 0 6 Gm for the No 60 powder and 0 2 Gm for the No 80 powder The increased imbibition may be due largely to the fact that the cell cavities are able to hold more liquid after some of the cell contents have been removed The larger particles, having a greater proportion of undamaged cells, would be able to hold more solvent in cell cavities As the fineness of the powder increases, and fewer undamaged cells remain, it would follow that the increase in imbibition on removal of some of the cell contents would become smaller, on the basis that the removal of cell contents from damaged cells would decrease the size of the particles without leaving an enclosed cavity capable of mechanically holding a liquid The observed results are in accord with this hypothesis

Calculations indicate that in the No 20 powder, some of the alkaloids remain undissolved during all five successive macerations, this may be due in part to the fact that for this size of powder the amount of extractive matter removed is the lowest observed in this series of experiments and the extractive remaining in the marc may shield the alkaloid from contact with the solvent, the alternative explanation would be that the constituents having a part in the adsorption of alkaloids by the marc have not been sufficiently removed With the No 40 powder,

the rate of extraction is more rapid, but at the end of the fifth maceration a small amount of alkaloids still remains undissolved With the No 60 and 80 powders, all of the alkaloids seem to be removed in the first three macerations, in both cases, calculations show that there is some undissolved or adsorbed alkaloids after the first maceration but all the alkaloids are dissolved during the second maceration and finally removed in the third maceration (that is to say, the amount remaining after the third maceration is less than 0 0005 Gm and hence is neglected)

Certain aspects of the results in Table XXVII are brought out by the calculations presented in the following table

TABLE XXVIII —RESULTS ON EXTRACTION OF POWDERED BELLADONNA ROOT WITH SUCCESSIVE PORTIONS OF MIXTURE OF ALCOHOL 5 VOL —WATER 1 VOL

Fineness of Powder	Percentage of Total Alkaloids in First Macerate	First Two Macerates	First Three Macerates
No 20	68	85	91
No 40	73	93	98
No 60	83	98	100
No 80	81	98	100

Table XXVIII indicates that extraction of alkaloids from powdered belladonna root by maceration was most efficient in the No 60 and No 80 powders

EFFECT OF VARIATION IN SOLVENTS ON EXTRACTION OF BELLADONNA ROOT

Alcohol-Water Mixtures —Using belladonna root in No 40 powder (the fineness of powder specified by the U S P X for the Fluidextract of Belladonna Root), tests were made of the effect of variations in the alcoholic strength of menstrua, this question was studied by the technique of successive macerations with the use of the centrifuge In each experiment exactly 10 00 Gm of belladonna root in No 40 powder (moisture content = 9 60 per cent) were used, while in each maceration 90 00 Gm of the specified menstruum were employed

TABLE XXIX —EFFECT OF VARIOUS ALCOHOLIC MENSTRUA ON POWDERED BELLADONNA ROOT ON MACERATION WITH SUCCESSIVE PORTIONS OF SOLVENT

	Maceration	Liquid in Marc	Dry Marc	Weight in Grams of Macerate	Loss of Menstruum	Total Extractive	Alkaloids
a	Alcohol						
	1st	15 9	8 52	75 3	0 2	0 52	0 011
	2nd	15 9	8 23	90 0	0 3	0 27	0 003
	3rd	15 9	8 06	90 0	0 3	0 26	0 001
	4th	16 1	7 93	89 7	0 2	0 19	0 000
	5th	16 0	7 84	90 0	0 2	0 16	0 000
	Marc						0 024
						Total =	0 039
b	Mixture of Alcohol 95 Vol —Water 5 Vol						
	1st	15 7	8 14	75 9	0 3	0 90	0 022
	2nd	16 1	7 71	89 6	0 4	0 43	0 006
	3rd	16 3	7 48	89 6	0 4	0 23	0 001
	4th	16 4	7 33	89 8	0 2	0 15	0 000
	5th	16 6	7 23	90 0	0 0	0 10	0 000
	Marc						0 010
						Total =	0 039

c Mixture of Alcohol 9 Vol —Water 1 Vol

1st	16 0	7 96	75 6	0 2	1 11	0 026
2nd	16 9	7 43	89 7	0 2	0 50	0 007
3rd	17 1	7 18	90 0	0 1	0 25	0 001
4th	17 2	7 03	90 0	0 1	0 15	0 000
5th	17 2	6 93	89 9	0 1	0 10	0 000
Marc						0 006
					Total =	0 040

d Mixture of Alcohol 7 Vol —Water 1 Vol

1st	16 6	7 82	75 5	0 1	1 22	0 027
2nd	17 2	7 28	89 8	0 2	0 54	0 007
3rd	17 4	7 06	89 9	0 2	0 25	0 002
4th	17 5	6 90	89 8	0 1	0 16	0 001
5th	17 9	6 82	89 7	0 1	0 08	0 000
Marc						0 002
					Total =	0 039

e Mixture of Alcohol 5 Vol —Water 1 Vol

1st	17 0	7 62	75 5	0 0	1 42	0 036
2nd	17 9	7 07	89 6	0 1	0 55	0 009
3rd	18 0	6 84	90 3	0 0	0 26	0 002
4th	18 3	6 72	89 9	0 0	0 12	0 000
5th	18 1	6 64	90 3	0 0	0 08	0 000
Marc						0 001
					Total =	0 045

f Mixture of Alcohol 4 Vol —Water 1 Vol

1st	17 5	7 47	75 1	0 0	1 57	0 034
2nd	18 3	6 88	89 9	0 0	0 59	0 009
3rd	18 6	6 66	89 9	0 0	0 22	0 001
4th	18 3	6 55	90 3	0 0	0 11	0 000
5th	18 6	6 48	89 9	0 0	0 07	0 000
Marc						0 001
					Total =	0 045

g Mixture of Alcohol 7 Vol —Water 3 Vol

1st	18 3	7 23	74 5	0 0	1 81	0 035
2nd	19 2	6 68	89 7	0 0	0 55	0 007
3rd	19 6	6 50	89 7	0 1	0 18	0 001
4th	19 4	6 42	90 2	0 1	0 08	0 000
5th	19 1	6 38	90 2	0 2	0 04	0 000
Marc						0 001
					Total =	0 044

h Mixture of Alcohol 1 Vol —Water 1 Vol

1st	19 8	7 04	73 1	0 1	2 00	0 034
2nd	20 8	6 52	89 4	0 1	0 52	0 007
3rd	21 2	6 38	89 6	0 1	0 14	0 001
4th	20 8	6 30	90 3	0 2	0 05	0 000
5th	21 0	6 30	89 7	0 2	0 03	0 000
Marc						0 001
					Total =	0 043

2 Mixture of Alcohol 1 Vol —Water 2 Vol						
1st	23 2	7 07	69 9	0 0	1 97	0 031
2nd	23 7	6 50	90 2	0 0	0 57	0 008
3rd	23 0	6 34	90 9	0 0	0 16	0 001
4th	23 1	6 28	90 1	0 0	0 06	0 001
5th	22 5	6 24	90 5	0 1	0 04	0 000
Marc						0 002
						Total = 0 043

The results indicate that imbibition increases as the proportion of alcohol in the menstruum decreases The amount of total extractive obtained likewise increases with a decrease in alcoholic strength of the menstruum Considering the results of the maceration experiments, it is seen that the four highest alcoholic strengths used do not make good menstrua for belladonna root, however, as the proportion of water increases there is a progressive increase in efficiency of extraction of the alkaloids The four next proportions, *i e*, alcohol 5 vol —water 1 vol, alcohol 4 vol —water 1 vol, alcohol 7 vol —water 3 vol and alcohol 1 vol —water 1 vol have approximately the same efficiency, resulting in extraction of substantially all of the alkaloid As far as the results go the official menstruum for the U S P X Fluidextract of Belladonna Root appears to be well chosen

With the higher strengths of alcohol the values for the total alkaloid obtained from the macerates plus the marc were lower than with the more dilute solutions of alcohol Further tests showed that the U S P X method for determination of alkaloids of belladonna root applied to the marc did not take out all of the alkaloids in cases where the drug had been treated with alcohol of 82 5 per cent by volume or higher This was shown by exhaustively extracting 10 00 Gm of powdered belladonna root with alcohol, which yielded 0 039 Gm of alkaloids, followed by exhaustive extraction with the U S P X menstruum (alcohol 5 vol — water 1 vol), which yielded 0 011 Gm of alkaloids It thus appears that when the drug has been treated with a strong alcoholic menstruum, neither the menstruum nor the ether-chloroform mixture is capable of extracting all of the alkaloids But as shown, the official menstruum is capable of removing the remainder of the alkaloids Possibly the stronger alcoholic menstrua precipitate certain water-soluble constituents which envelop a portion of the alkaloids in such a manner that it cannot be extracted either by the strong alcoholic menstrua or by ether chloroform mixture When treated with more aqueous menstrua the precipitated matter might then be dissolved and the alkaloids extracted 10 00 Gm of belladonna root in No 40 powder assayed by the U S P X method yielded 0 045 Gm of alkaloids, while with alcohol and the official menstruum, 0 050 Gm of alkaloids was obtained There is a possibility that the U S P X assay does not extract all of the alkaloids

Thus it is shown that the discrepancy in total alkaloids is caused by the fact that ether-chloroform mixture does not extract all of the alkaloids when used on a marc which has been treated with strong alcoholic menstrua In Table XXIX it is thus clear that full reliance may be placed on the analyses of the macerates themselves, but that the analyses of the marcs may best be disregarded The data on the marcs are not necessary for interpreting the extraction data, the marcs having been analyzed merely as a check on the analyses of the macerates

Acidic Menstrua.—Since the use of acid in the menstrua for some alkaloidal drugs has been considered advantageous, it was of interest to determine the value of acidic menstrua in the extraction of belladonna root. Using the technique of macerations with successive portions of solvent with the use of the centrifuge as described earlier in the article, tests were made in which hydrochloric acid replaced part of the water used in the official menstruum for the U. S. P. X. Fluidextract of Belladonna Root.

TABLE XXX.—EXTRACTION AND IMBIBITION OF BELLADONNA ROOT IN NO. 40 POWDER ON MACERATION WITH SUCCESSIVE PORTIONS OF SOLVENT

10.00 Gm. of drug of moisture content = 9.60 per cent.
90.00 Gm. in each maceration of a mixture of alcohol 5 vol.—water 0.4 vol.—U. S. P. HCl 0.6 vol.

Maceration	Weight in Grams of: Liquid in Marc.	Dry Marc.	Macerate	Loss of Menstruum	Total Extractive	Alkaloids
1st	17.2	7.63	75.0	0.2	1.41	0.033
2nd	17.5	7.09	90.0	0.2	0.54	0.008
3rd	17.8	6.84	89.8	0.2	0.25	0.001
4th	18.0	6.70	89.6	0.3	0.14	0.001
5th	17.9	6.59	90.0	0.2	0.11	0.001
Marc						0.001
						Total = 0.045

The results in Table XXX may best be compared with Table XXIX*e*. The rate of extraction of alkaloids and extractive matter by the official menstruum corresponds closely with the rate of extraction using the acidified menstruum. Imbibition of menstruum by the marc is the same in both cases. It is thus seen that the addition of acid was of no benefit in the maceration process used.

SUMMARY

Methods were developed for determining the swelling effect of solvents on drugs and other vegetable tissues in the form of thin strips, blocks and powders. The rate of penetration of solvents through cells was determined. The solvents studied included various binary and ternary mixtures of water, alcohol and glycerin and some of the newer solvents of the glycol type. Using powdered belladonna root, studies were made of the effect of fineness of powder and variation in solvents on imbibition and extraction in a maceration process.

REFERENCES

(1) W. L. Scoville, JOUR. A. PH. A., 16 (1927), 146.

(2) W. L. Scoville, *Ibid.* 21 (1932), 880.

(3) Reinke, cited by Hatschek. An Introduction to the Physics and Chemistry of Colloids," 4th Edition, P. Blakiston's Son and Co., page 113.

(4) D. T. MacDougal. Hydration and Growth,' Carnegie Institution of Washington Publication No. 297, 1920, pages 73, 92, 109.

(5) Klebs, cited by Cowdry, *et al.*, General Cytology" University of Chicago Press, 1924, page 109.

(6) Nägeli cited by Schorger. Chemistry of Cellulose and Wood. McGraw-Hill Book Co., Inc., 1926, pages 9, 18.

(7) Koehler. The Properties and Uses of Wood" N. Y. 1924, page 50; cited by Schorger. Chemistry of Cellulose and Wood' McGraw Hill Book Co. Inc. 1926, page 18.

AN INVESTIGATION OF GLEDITSCHIA TRIACANTHOS (LINNÉ) *

BY Y THOMAS OESTER

These studies on *Gleditschia triacanthos* (Linne), the common honey locust, had their origin at the University of Notre Dame As early as 1926, King (1) at Notre Dame discovered that *Gleditschia triacanthos* possessed pharmacodynamic activity Rudduck (2) extended these pharmacodynamic studies, Simons (3) succeeded in isolating an active principle which possessed marked oxytocic properties He called this principle *hypoxysin* Two Japanese workers, Matshshima and Kubota (4) isolated a potent glucoside or saponin from a related species, *Gleditschia horrida* Their only published pharmacological study was upon the toxicity of the glucoside Simons showed that his constituent did not respond to the common glucoside tests The latest work (5) was that of the writer

EXTRACTION OF ACTIVE PRINCIPLES

During the past three years investigations have been undertaken with these objectives in mind

1 Detailed study of the blood pressure reaction of the drug, which Simons (*loc cit*) indicated was present in the leaves, also allied pharmacological studies
2 Determination of the nature of this principle
3 Determination of its mode of action
4 Comparison study of this principle contrasted with the common pressor and depressor substances

In the preliminary work, the statements of the previous investigators were substantiated, that aqueous percolates of the leaves are the most potent Various menstrua and methods of extraction were tried but aqueous percolation appears to be the most suitable There is, however, a large amount of tannin and coloring matter in all aqueous extracts Their presence offers difficulties in isolating the active constituent The *hypoxysin* was removed by the method of Simons, and all work was done with the hypoxysin-free extracts

No successful procedure has been developed for the isolation of the active blood pressure constituent This, despite the use of the following procedures

1 Original percolations were made using alcohol, acetone, acidified acetone, chloroform, ether and petroleum ether Injections of aqueous extracts from dried residues of these percolates gave no marked blood pressure reactions
2 Normal aqueous percolations, acid and basic, were subjected to a shaking out process with the following solvents, ether, chloroform, petroleum ether carbon tetrachloride, ethyl acetate, amyl alcohol and benzene
3 Dried aqueous extracts were treated with the following reagents, alcohol, ether, chloroform benzene, carbon tetrachloride, acetone xylene, acidified alcohol and acidified acetone
4 The following agents, animal charcoal kaolin, picric acid, hexamethylenetetramine, lead oxide, magnesium oxide and purified talc, failed to separate the potent constituent from the extraneous matter
5 The procedure as detailed by Fuller (6) was also followed
6 Steam distillation failed to bring about a separation of the active constituent

* Scientific Section, A PH A , Washington meeting, 1934

PHARMACODYNAMIC ACTIVITY

The following studies were made dealing with the pharmacodynamics of the aqueous extracts after the removal of the *hypoxysin*

1 The oxytocic nature of *hypoxysin* itself was substantiated by experiments upon the isolated uterus of the guinea pig Pittenger's procedure (7) was used

2 Intravenous injections of aqueous extracts produced no marked influence upon the respiration of the etherized dog A tambour encircling the chest was used to record the respiration

3 The aqueous extracts exert some influence upon voluntary muscle In the frog's gastrocnemii, there was a noticeable increase in the amount of work, and fatigue was delayed

4 There is very little effect upon ventricular contraction when the extract is injected intravenously Only during the period of lowest blood pressure was there a noticeable decrease in ventricular systole The Guthrie myocardiograph was used to record the ventricular response

5 In direct perfusion and irrigation of frog's and turtle's hearts recorded by the suspension cardiograph, outlined by McGuigan (8), there was at first a slight decrease in frequency although an improvement in force Upon extended perfusion or irrigation, however both frequency and force are decreased

6 The blood pressure activity of the Gleditschia extracts consists chiefly in a marked lowering of blood pressure Following this there is a gradual return to normal The reaction seems to be more effective than that following the use of the common nitrites

7 The depressor effects appear to be due to direct action of the drug on the musculature of the blood vessels because

(*a*) The heart frequency and force are not markedly affected by the injections of the drug

(*b*) Adrenalin, acting as a stimulant to the nerve endings in the arterial wall, normally brings about a constriction This action is unimpaired by the previous use of the Gleditschia extract From this result it is apparent that the extract does not affect the nerve endings Therefore it is assumed that the arterial musculature and Rouget cells produce the change in blood pressure

8 Direct experimentation on arterial rings from the sheep's carotid artery showed that there is a decrease in tone upon the application of Gleditschia extract The experimental procedure used was the same as that outlined for the isolated uterus

DEPRESSOR CONSTITUENT

A large number of experiments upon the blood pressure of the etherized dog lead to the following conclusions

1 The blood pressure constituent may be extracted from the crude drug by the use of an aqueous menstruum

2 The blood pressure constituent is not soluble to any marked extent in the following solvents ether, ethyl acetate, carbon tetrachloride carbon disulphide, petroleum ether, amyl alcohol acetone or benzene

3 Changes in p_H within a small range, either above or below 7 35 do not affect the activity of the principle to any marked degree

4 No toxicity was ever noted on any of the injections, although some represented as much as four Gm of the crude drug

5 Aqueous extracts of the drug gave negative tests for alkaloids and glucosides It appears from the general nature of the extracts that the active constituent is a complex neutral principle of a gummy consistency

SUMMARY

The common methods of separating active constituents are of little value when applied to aqueous extraction of *Gleditschia triacanthos*

There appear to be two active constituents, *hypoxysin*, isolated by Simons, and a second which has marked depressor action

From a preliminary investigation of the extracts it would seem that the active blood pressure constituent is a neutral principle of gum-like consistency

The depressor action is best obtained from aqueous extracts

The depressor activity seems to be caused by a direct action of the drug upon the musculature of the blood vessel

The drug has very little effect upon the heart rate or force The respiration is uninfluenced by the injections of the drug

Administration of the drug causes an increase in the amount of work performed by voluntary muscle, also a delay of fatigue

BIBLIOGRAPHY

(1) G F King, A Thesis, University of Notre Dame (1926)
(2) H I Rudduck, A Dissertation, University of Notre Dame (1929)
(3) J C Simons, A Dissertation, University of Notre Dame (1931)
(4) Y Matshshima and Kubota, *J Pharm Soc Japan*, 48 (1928), 146–150
(5) Y T Oester, A Dissertation, University of Notre Dame (1933)
(6) H C Fuller ' The Chemistry and Analysis of Drugs and Medicines" (1920), John Wiley and Sons, Inc
(7) P S Pittenger, 'Biologic Assays," 2nd Edition (1928), P Blakiston's Son & Co
(8) Hugh McGuigan, Chemical Pharmacology" (1919) Lea & Febiger

DEPARTMENTS OF BIOLOGY AND PHARMACY,
UNIVERSITY OF NOTRE DAME

ASSAY OF BARBITURIC ACID DERIVATIVES

Barbituric acid derivatives, when mixed with silver nitrate form soluble silver compounds which are only very slightly dissociated and therefore do not form silver oxide with alkali This reaction may be used for their assay as follows 0 2 to 0 3 Gm is dissolved in 30 mils of water with the addition of 1 Gm of anhydrous sodium carbonate, and *N*/10 silver nitrate is run in until there is obtained a distinct turbidity which remains for some time One equivalent of silver then corresponds to one molecule of the barbituric acid derivative The method may be used for diethyl barbituric, phenylethylbarbituric cyclohexenylethylbarbituric, diallylbarbituric, isopropylbrom propenylbarbituric and butylbrompropenyl barbituric acids but not for *N* methylated derivatives such as evipan and prominal —H Budde in *Apothekerzeitung*, 49 (1934), 295, through *Quarterly Journal of Pharmacy and Pharmacology*

CINCHOPHEN POISONING

A J Quick (New York) regards the acute yellow atrophy of cinchophen poisoning as a form of allergic reaction—Arthus's phenomenon This is a severe localized inflammatory process which may be produced in animals by injection of a protein The reaction is due to a metabolic derivative, not to the cinchophen itself Quick advises certain precautions in its administration the drug should be given under medical supervision and large doses should be avoided, it should not be given to persons sensitive to foreign proteins and such proteins should not be given at the same time, cinchophen should never be given intravenously, and it should be given with caution to patients with damaged livers In acute yellow atrophy glucose and insulin (5 to 10 units three times a day) should be given, calcium gluconate and liver extract are also of value —*Am J Med Sci* Jan 1934 115–121 Through *The Prescriber*

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G *DuMez, University of Maryland, School* of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

PHARMACOPŒIAS AND FORMULARIES

Gough, J H
The British Pharmaceutical Codex, 1934
Pharm J , 133 (1934), 477
Lavoye, M
Anomalies of the Belgian Pharmacopœia IV
J pharm Belg , 16 (1934), 847
Thorpe, Jocelyn
The British Pharmaceutical Codex, 1934
Pharm J , 133 (1934), 505
v Vamossy, Z
Review of the new Hungarian Pharmacopœia
Pharm Monatsh , 15 (1934), 231

APPARATUS AND MANIPULATIONS

Anon
Apparatus for pharmaceutical manufacturing on a small scale 6 Suppository press
Schweiz Apoth -Ztg , 72 (1934), 663
Andrews, Marvin J
Determination of the reasonable or permissible margin of error in dispensing IV Pills
Jour A Ph A , 23 (1934), 1117
Davis, H , and Gillett, F H
Small scale tablet making
Pharm J , 133 (1934), 475, 503
Gunn, Colin
Filling rubber capped bottles by suction
Pharm J , 133 (1934), 559
White, John
Sterilization by filtration
Schweiz Apoth -Ztg , 72 (1934) 616

PHARMACEUTICAL PREPARATIONS

Burlinson, H
The preservation of mucilage of tragacanth
Quart J Pharm & Pharmacol , VII (1934), 492
Davis, H
The preparation of sterile solutions
Quart J Pharm & Pharmacol VII (1934), 379
Eschenbrenner H
Preparation of sterile solutions for injection
Pharm Acta Helv , 9 (1934) 178
Haddock, L A
The viscosity of tragacanth mucilage
Quart J Pharm & Pharmacol , VII (1934) 505
Hill, C A and Powell A D
The loss of phenol from phenol lozenges
Quart J Pharm & Pharmacol , VII (1934), 535
Huzum J
Belladonna extract prepared by fermentation
Boll chim -farm (1934), 73 371, through *B C A B* (1934), 732, through *Pharm J* , 133 (1934), 562
Lupton, A W
The preparation of a dry extract of ipecac, with some notes on ipecac root of commerce
Quart J Pharm & Pharmacol VII (1934), 483
Morton C , and Bateson F R C
The composition and stability of Donovan's solution
Quart J Pharm & Pharmacol , VII (1934), 447
Van Pinxteren, J A C
Contribution to the pharmacy of ergot
Pharm Weekbl , 71 (1934), 1230
Woodard, W A , and Pickles J
The stability of mixtures of hydrogen peroxide and ethyl alcohol
Quart J Pharm & Pharmacol , VII (1934), 418

PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Butz, Lewis W , and LaLande W A , Jr
Anthelmintics I The effect of hydrogen peroxide and some oxygenated terpene hydrocarbons upon ascaris lumbricoides
Jour A Ph A 23 (1934) 1088
Crosbie, Howard H
The testing of ergot
Jour A Ph A 23 (1934), 1110
Dick, George F , and Gladys Henry
Is there a scarlet fever toxoid?
J A M A 103 (1934) 1362
Easson, A P T , *et al*
The relation between chemical constitution and purgative action
Quart J Pharm & Pharmacol VII (1934), 509
Edmunds Charles W , *et al*
Studies on morphine addiction problem

J A M A, 103 (1934), 1417
Forbes S B, and Blake, W C
Fatality resulting from the use of Lash-lure on the eyebrow and eyelashes
J A M A, 103 (1934) 1441
Gold Harry and Travell, Janet
Strychnine in poisoning by alcohol
J Pharmacol & Exper Therap 52 (1934) 345
Himmelsbach, C K
The addiction liability of codeine
J A M A 103 (1934), 1420
Huggett, A St George
The mechanism of the anti-coagulant action of azo-dyes in blood clotting
Quart J Pharm & Pharmacol VII (1934), 372
Maloney, A H
Barbiturates in local anesthetic toxicity
J Pharmacol & Exper Therap, 52 (1934), 297
Reifenstein, Edward C and Allen Ellery G
The treatment of chronic hemolytic jaundice with liver extract
J A M A 103 (1934) 1668
Rowntree, L G, *et al*
The biologic effects of thymus extract (Hanson)
J A M A 103 (1934) 1425
Stroud C Malone
The use of dilaudid in the pain of cancer
J A M A 103 (1934), 1421
Stuart Elmer H, and Bibbins Francis E
Laboratory notes on the stabilization of fluid-extract of ergot
Jour A Ph A, 23 (1934) 1104
Travell, Janet and Gold Harry
Ether and strychnine antagonism
J Pharmacol & Exper Therap 52 (1934), 259
Wokes F and Willimott, S G
The cardiac activity and toxicity towards rats of red and white squills from Cyprus
Quart J Pharm & Pharmacol VII (1934) 565

BOTANY AND PHARMACOGNOSY

Coutts, J
The seasonal variation of santonin in Scottish Artemisias
Quart J Pharm & Pharmacol, VII (1934), 392
Dewar, T
Histology of the leaves of Digitalis Lanata Ehrh
Quart J Pharm & Pharmacol VII (1934) 331
Fuji, K and Shimada, H
Constituents of the root of Sanquisorba Officinalis L, II
J Pharm Soc Japan No 631 (1934) 129
Haller, H L and LaForge F B
Rotenone XXX The non-crystalline constituents of Derris root
J Am Chem Soc, 56 (1934), 2415
Kimura Y, and Hoshi, M
Constituents of Alpinia japonica Miq, II
J Pharm Soc, Japan No 631 (1934), 135
Lundsgaard Einar, and Schou Svend Aage
Hormones and hormone preparations, II
Arch Pharm og Chem 41 (1934), 625, 653
Martin-Sans, E, and Lheritier G
Root of sarsaparilla indigenous to France
Bull sci pharmacol 41 (1934), 524
Nakao M and Fukushima, T
Chemical composition of Salvia Miltiorrhiza (Chinese drug Tan-Shen), I
J Pharm Soc Japan No 631 (1934), 150
Saber, A Hifny
Senna stalk Its anatomy and detection in powdered senna
Quart J Pharm & Pharmacol, VII (1934), 422
Saber A Hifny
The determination of senna stalk in senna
Quart J Pharm & Pharmacol, VII (1934) 435
Sage C Edward
Dried green mint
Perf & Ess Oil Rec 25 (1934) 300
Wallis, T E, and Withell, E R
The fluorescence and detection of Rhapontic rhubarb
Quart J Pharm & Pharmacol VII (1934), 574

ALKALOIDS AND GLUCOSIDES

Bernal, J D and Crowfoot, D
X-ray crystallographic measurements on some derivatives of cardiac aglucones
Chem & Ind, 53 (1934), 953
Buchi, J
Determination of alkaloids and extraction of ipecac root
Pharm Acta Helv, 9 (1934) 184
Couch, James Fitton
Lupine studies VIII The alkaloids of Lupinus Palmeri, S Wats
J Am Chem Soc 56 (1934), 2434
Laurence and Labarre
Determination of morphine by iodometry
J Pharm et Chim, 20 (1934), 353
Pizer N H
Notes on the determination of nicotine by the silicotungstic acid method
Chem & Ind, 53 (1934) 356T
Raymond-Hamet and Millat G
New observations on mitrinermine, an alkaloid of Mitragyna
Bull sci pharmacol, 41 (1934), 533
Regnier Jean and David Robert
Conservation of cocaine after sterilization. II
Bull sci pharmacol, 41 (1934), 547

Suzuki, H, *et al*
Alkaloids of the Chinese drug "Chin-Shih-Hu," III
J Pharm Soc Japan, No 631 (1934), 138, 146

OILS FATS AND WAXES

Cocking, T Tusting, and Crews S K
The fluorescence test for olive oils
Quart J Pharm & Pharmacol, VII (1934), 531
Deltour Paul
Detection of sesame oil in olive oil
J pharm Belg, 16 (1934), 893
Evers, N, and Smith W
The analytical classification of the fish liver oils IV and V
Quart J Pharm & Pharmacol VII (1934) 476
Hampshire C H and Page, G R
The determination of camphor in galenicals by means of 2 4-dinitrophenylhydrazine
Quart J Pharm & Pharmacol VII (1934), 558
Lepper, W
Determination of codliver oil in emulsions
Z anal Chem (1934) 98, 164 through *Pharm Weekbl*, 71 (1934), 1199
Taufel K, *et al*
Determination of acetyl values of fats I Determination of combined acetic acid
Chem & Ind, 53 (1934), 969B

ANALYTICAL METHODS AND RESULTS

Anon
Micro-chemical detection of aldehydes and ketones
Perf & Ess Oil Rec 25 (1934), 301
Beardsley, W J, and Styles, B J
The determination of mercury in Hydrargyrum cum Creta
Quart J Pharm & Pharmacol VII (1934) 541
Brindle H
The assay of phenazone
Quart J Pharm & Pharmacol VII (1934), 453
Brown C L M
Methyl, isopropyl and amyl alcohols in ethyl alcohol
Pharm J, 133 (1934) 560
Büchi, J
Assay and stability of Spiritus Formicæ Ph V
Pharm Acta Helv 9 (1934) 169
Dietzel, R
On the question of the "normung" of drugs
Apoth -Ztg, 49 (1934) 1476
Dille, James M and Koppanyi Theodore
Studies on barbiturates III Chemical assay of barbiturates
Jour A Ph A, 23 (1934), 1079
Ferrey, G J W
The determination of phosphorus in phosphate, hypophosphite and glycerophosphate syrups
Quart J Pharm & Pharmacol VII (1934), 346
Francois M T
Methods of determination and the different definitions of the acetyl value
Chem & Drug 53 (1934), 969B
Gnessin D
New apparatus for the determination of arsenic by the Gutzeit method
Pharm Zentralh, 75 (1934), 719
Hall G F, and Powell, A D
The analysis of acriflavine B P and neutral acriflavine
Quart J Pharm & Pharmacol, VII (1934), 522
Hampshire C H and Page, G R
A note on the sulfuric acid test for liquid paraffin
Quart J Pharm & Pharmacol VII (1934) 354
Hartley, F, and Linnell W H
The use of diphenylamine in the assay of saccharated iron compounds
Quart J Pharm & Pharmacol VII (1934), 549
Hartmann A C
Investigation of methods to distinguish between artificial vinegar and vinegar of fermentation
Dansk Tids Farm, 8 (1934) 297
Heading, W R
A new method of analysis of some mercurial ointments
Quart J Pharm & Pharmacol, VII (1934), 406
Heading, W R
An improved method for the assay of strong ointment of mercuric nitrate
Quart J Pharm & Pharmacol VII (1934) 413
Hitchens Richard M
A new method of determining acetylsalicylic acid in the presence of medicinal products
Jour A Ph A 23 (1934) 1084
Koppanyi, Theodore, *et al*
Studies on barbiturates II Contributions to methods of barbital research
Jour A Ph A, 23 (1934), 1074
Lehmann Ursula
Determination of glycyrrhizinic acid in Succus Liquiritiæ
Apoth -Ztg 49 (1934), 1425
Leymarie, Joseph
Method for the determination of moisture in pharmaceutical and food products
J Pharm et Chim 20 (1934), 385
Lockwood, H C
The determination of "Ethyl" Vanillin
Perf & Ess Oil Rec, 25 (1934), 312

Mallory, G E, and Valaer, Peter
Determination of artificial color in whisky
Ind Eng Chem, 26 (1934), 474
Page, G R
Notes on some Pharmacopœial Tests I Quinine ethyl carbonate, atropine sulphate, potash alum, aloin, solution of cresol with soap
Quart J Pharm & Pharmacol, VII (1934), 361
Parkinson, A Eric, and Wagner, E C
Estimation of aldehydes by the bisulfite method
Ind Eng Chem, 26 (1934), 433
Schrader, Hellmuth
Viscosity of oil preparations
Pharm Zentralh 75 (1934), 689
Seifert, R, and Sobel G
Table showing the weights of 100 cc and volumes of 100 Gm. of drugs and chemicals
Schweiz Apoth-Ztg, 72 (1934), 631
Straka, Leora E, and Oesper, Ralph E
Oxidation-reduction indicators for use with dichromate
Ind Eng Chem, 26 (1934), 465
Vasbinder, H
Micro-determination of the Reichert-, Meiszl-, Wollny-, Polenske- and New-Kirschner numbers
Pharm Weekbl, 71 (1934), 1193
Wetherell, S
The assay of strong solution of lead subacetate
Quart J Pharm & Pharmacol, VII (1934), 459

INORGANIC AND PHYSICAL CHEMISTRY

Carter, F E
The preparation of a stable form of ferrous chloride
Quart J Pharm & Pharmacol, VII (1934), 389
Chapin, Robert M
The effect of hydrogen-ion concentration on the decomposition of hypohalites
J Am Chem Soc 56 (1934), 2211
Hough, W A, and Ficklen, J B
Volatilization of iodine from dilute iodine-potassium iodide solutions
Ind Eng Chem, 26 (1934) 460
Peronnet, M, and Crete, P
Adsorption of salol and aspirin in alcoholic solution by activated charcoal
J Pharm et Chim, 20 (1934), 359
Scheringa, K
Modifications of lead oxide
Pharm Weekbl 71 (1934) 1197
Ting, Hsü Huai, and McCabe, Warren L
Solubility of magnesium sulphate heptahydrate
Ind Eng Chem, 26 (1934), 1207

ORGANIC CHEMICALS

Bird, F C J
A note on mercuric oxycyanide
Quart J Pharm & Pharmacol, VII (1934), 581
Jurist A E, Van Winkle, J R, and Christiansen W G
Physical properties of neoarsphenamine powder
Jour A Ph A 23 (1934) 1094
Marshall J
A note on the preparation of pure acriflavine
Quart J Pharm & Pharmacol, VII (1934), 514
Moore Maurice L, Day, A A, and Suter, C M
The preparation and germicidal properties of some derivatives of 4-*n*-butylresorcinol
J Am Chem Soc, 56 (1934), 2456
Rymill F E and Corran, R F
Further studies on mercurochrome
Quart J Pharm & Pharmacol VII (1934), 543
Shonle, H A and Kleiderer E C
Mixed melting point curves of some dialkylbarbituric acids
J Am Chem Soc 56 (1934), 2489
Wagenaar, M
Microchemistry of adoline
Pharm Weekbl, 71 (1934), 1261

CLINICAL TESTS

Bourdeau, Marcel
Micro-determination of lactic acid in the blood
J Pharm et Chim, 20 (1934), 342
Fouchet M
Practical method for the detection of barbituric acid derivatives in the urine
J Pharm et Chim 20 (1934), 403

HOSPITAL FORMULARIES

Dean E T Motley, of the University of South Carolina School of Pharmacy, as a member of a special committee appointed by the American Pharmaceutical Association, has begun the task of assembling copies of hospital formularies used in the states of Georgia Florida, Tennessee and the Carolinas

The A Ph A group, known as the "Committee for the Collection of Information Pertaining to Professional Pharmacy" is gathering medicinal formulas from all parts of the United States, to be assembled and placed in the American Institute of Pharmacy in Washington as a source of reference for those interested in this type of work.—*Southeastern Drug Journal*

THE EFFECT OF AGE ON THE RATE OF DISINTEGRATION OF MANUFACTURED MEDICINAL TABLETS

BY GEORGE E ÉWE

The effect of age on the rate of disintegration of manufactured medicinal tablets is an important subject for investigation since excessively retarded disintegration may reduce the efficacy of the tablets

Other than the extensive investigation made by a Committee of the American Pharmaceutical Manufacturers' Association under the Chairmanship of Dr C S Leonard (1), (2) there is practically a total dearth of published data on this subject Using the methods of testing the rate of disintegration previously devised by the Committee on Project No 1 of the American Pharmaceutical Manufacturers' Association (3) Dr Leonard's Committee studied the effect of aging for 1 year on 30 different kinds of tablets most of which were suspected of "hardening" (that is, showing retarded disintegration) in time In summarizing the work of his Committee Dr Leonard found that all of the tablets, with the possible but doubtful exception of one, still retained their disintegration rate of classification as defined by the aforesaid "Committee on Project No 1" after aging for one year

As a contribution to the literature on this subject the effect of aging for 1 year on the rate of disintegration of 228 different kinds of medicinal tablets of various types was determined by the writer Of this number 8 were hypodermic tablets, 137 were uncoated compressed tablets and 83 were coated compressed tablets and included tablets of all of the classes defined by the Committee on Project No 1 (3) with the exception of Class No 9 The methods of testing the rate of disintegration were those of the Committee on Project No 1 (3) and the tablets were stored in cork-stoppered bottles in a dark closet during the aging period

For convenience of expression the terms "hardened" and "softened" will be used in this article if the time required for disintegration at the end of the aging period was respectively longer or shorter than the initial disintegration time, although the degree of hardness of a tablet is not a criterion of its disintegration rate In analyzing the results of the tests a tablet was arbitrarily considered to have "hardened" or "softened" if its final disintegration rate varied 25% or more from its initial disintegration rate, this figure of 25% variation being considered to be necessary to reconcile the variables represented by differences in duplicate determinations and variations in physical construction of individual tablets of the same batch Furthermore, since the changes in disintegration time upon aging were usually only a matter of several minutes at most, a 25% variation figure was not considered excessive as a basis for deciding whether the tablets had "hardened" or "softened "

Summarizing the voluminous results it was found that 9 5% of the uncoated compressed tablets "hardened" and 10 2% "softened," each kind of tablet, however, remaining well within the disintegration limits of its class as defined by the "Committee on Project No 1" (3) so that no practical loss of efficacy was suffered by the tablets chargeable to retarded disintegration upon aging Of the coated compressed tablets it was found that 25 3% had "hardened" and 7 2% had "softened," and also as in the case of the uncoated compressed tablets, all remained well within the disintegration limits of their classes None of the hypodermic tablets

showed a measurable change in disintegration rate upon aging These results are in line with those of Leonard (2) who found that 37% of all of the tablets examined by his committee required a longer time for disintegration after aging for 1 year and 23% required a shorter time, all, however, with the possible but doubtful exception of one, still remaining within their respective disintegration rate classification as defined by the aforesaid "Committee on Project No 1"

These results and those of Leonard (2) indicate that many tablets may show more rapid disintegration after aging rather than slower disintegration, which is contrary to the popular notion that newly made tablets are always more desirable in regard to rapidity of disintegration Effort is constantly made by producers to guard against so-called "hardening" of tablets with age and market tablets have been observed which disintegrated spontaneously due to over-zealousness of the producer in guarding his product against "hardening" or in insuring initially rapid disintegration The 228 kinds of tablets reported upon in this article were the products of a single manufacturer, did not constitute the total list of tablets put out by the manufacturer and were not selected for the tests but were taken for test successively as they happened to come up for manufacture The balance of the list of tablets will be also tested and if the conclusions warranted to date require modification a second communication will be made Since the tablets used in this work were the product of a single manufacturer this data does not establish the status of the general tablet market in respect to the effect of age on the rate of disintegration of tablets However, these results are likely indicative, since they are in line with Leonard's results which represented the products of several producers, and are published with the view of encouraging similar investigations and reports which cannot but react to the benefit of the consumer of these products The duty of the producer in this matter is pointed out by Leonard (2) as follows

> the only way a manufacturer can find out if his product hardens, if he is concerned about it, is to conduct just such a test as we have here reported Our Committee could not examine all varieties of tablets, that would be a Herculean task All we could hope to do was to show the trend and point out the method That our results were negative in that they did not show serious hardening speaks well for the products of the modern pharmaceutical manufacturer"

The corresponding duties of the jobber and retailer are also so ably stated by Dr Leonard in his report (2) that they deserve re-stating herewith in the interest of wider distribution

> "As one year is usually the maximum time of storage of tablets on the stock and jobbers' shelves this means that the manufacturer gets a satisfactory product into the retailer's hands What the latter may do with it cannot be predicted If he keeps it on his shelves for 5 years more, some products may seriously harden But we do not feel warranted in continuing the work of the Committee for 5 years to tell him so This is a problem for the Pharmaceutical Association
>
> "Deteriorations other than those of hardening, deteriorations of chemical nature which interfere with the pharmacodynamic action of some products may be expected to occur in 5 years, and are more serious than any hardening The problem of failure to move out retail stock in half a decade is a problem of economics and of medical psychology, and can best be dealt with by a policy of detail attention and return credits in cases of overstocking"

REFERENCES

(1) Proceedings, A P M A, 1932 (2) *Ibid*, 1933, (3) *Ibid*, 1930

RESEARCH LABORATORIES, TAILBY-NASON COMPANY, BOSTON, MASSACHUSETTS

WHY HAND-MOLDED HYPODERMIC TABLETS VARY *

BY S WALLEY BOWER

In a previous paper, dealing with variations in Hand-Molded Hypodermic Tablets,[1] it was shown that the variations in the molding of Morphine Sulphate Tablets ranged from 3 63% over strength to 7 67% under strength

It was thought desirable to consider the subject more in detail to determine what variations occurred in hypodermic tablets other than those of morphine sulphate Inasmuch as the morphine sulphate mass to make these tablets consisted of from 50 to 90 per cent of sieved morphine sulphate, it was considered advisable to take for comparison, tablets, the mass of which consisted principally of milk sugar, with very small quantities of medicinal ingredients This would make it possible to determine whether the densities of the powders entering into the various tablet masses made an appreciable difference with the errors in the final results

The tablets selected for this study were Atropine Sulphate, $^1/_{100}$ grain, Strychnine Sulphate, $^1/_{60}$ grain, and Scopolamine Hydrobromide, $^1/_{100}$ grain Thus, for comparison, different conditions were obtained as to the densities of the ingredients, the morphine sulphate being of a much lighter density than the sugar of milk in the tablets now to be considered

These tablets were hand made, a steel plate with 200 perforations being used, thus turning out 200 tablets with each molding The yields obtained in the pressing of these tablets, also the variations from the theoretical are shown in Table I

The figures in the first column represent the number of finished tablets calculated to be made from the tablet mass, and called the theoretical The second column shows the number of tablets obtained upon completion of the molding, while the third shows the count over or under theoretical The last column represents the error in per cent of each lot, taken as a single unit Considering the theoretical as one hundred per cent, those producing an over yield of tablets will be shown naturally as being under the theoretical, while those having an under yield will be shown as having a percentage over the theoretical

TABLE I —ERROR IN YIELD BASED ON THEORETICAL

	Theoretical	Yield	Over or under Theoretical	Per Cent
Atropine Sulphate.				
Lot 1	56,000	53,602	2,398 under	104 47
2	56,000	56,315	315 over	99 44
3	28,000	27,583	417 under	101 51
Strychnine Sulphate.				
Lot 1	70,000	73,132	3,132 over	95 74
2	70 000	70,090	90 over	99 87
3	70,000	69,070	930 under	101 35
Scopolamine Hydrobromide.				
Lot 1	21,000	21,215	215 over	98 99
2	21,000	20,800	200 under	100 96
3	21 000	20 330	670 under	103 30

* Section on Practical Pharmacy and Dispensing, Washington meeting 1934

[1] JOUR A PH A, 23 (1934), 36–40

The tablets of each lot were counted into as many complete divisions of 500 tablets as possible Each 500 was now weighed to obtain the highest and lowest 500 tablets in weight of the several lots This high and low were then compared with the theoretical weight of 500 tablets of the corresponding lot, and the percentage error computed This error is shown in Table II Also the percentage variation of each entire lot is repeated in the last column to afford an easy comparison with reference to this high and low per cent

TABLE II —COMPARISON OF HIGH AND LOW OF 500 TABLETS

Atropine Sulphate	High Per Cent	Low Per Cent.	Difference	Per Cent Variation in Entire Lot
Lot 1	105 23	101 22	4 01	104 47
2	102 95	100 07	2 88	99 44
3	100 22	97 69	2 53	101 51
Strychnine Sulphate				
Lot 1	96 89	92 99	3 90	95 74
2	99 14	95 78	3 36	99 87
3	101 67	100 06	1 61	101 35
Scopolamine Hydrobromide				
Lot 1	98 85	97 22	1 63	98 99
2	101 87	97 02	4 85	100 96
3	103 90	100 05	3 85	103 30

The 500 high tablets and the 500 low tablets of each lot were now subdivided into five parts of 100 tablets each and weighed From the 500 high tablets, the weight of the 100 tablets highest was noted The error in per cent of these was determined as based on the theoretical Also from the low 500 tablets, the weight of the 100 lowest was obtained, and its percentage error determined in the same manner

This percentage of the high 100 tablets may be used to represent the greatest deviation from the theoretical on the plus side, and the percentage of the low 100 tablets, the greatest deviation from the theoretical on the minus side As these two figures are the extreme limits of variation from the theoretical, the difference between these two percentages represents the variation in per cent of each lot of tablets

TABLE III —EXTREMES OF VARIATION

Atropine Sulphate	High Per Cent.	Low Per Cent.	Difference Per Cent	Variation in 500 Per Cent.
Lot 1	105 57	100 92	4 65	4 01
2	103 47	99 92	3 55	2 88
3	100 40	97 39	3 01	2 53
Strychnine Sulphate.				
Lot 1	97 66	92 77	4 89	3 90
2	99 67	95 39	4 28	3 36
3	102 00	99 59	2 41	1 61
Scopolamine Hydrobromide.				
Lot 1	98 98	97 10	1 88	1 63
2	102 17	96 48	5 69	4 85
3	104 40	99 80	4 60	3 85

These results are shown in Table III The first column shows the greatest variation from the theoretical on the plus side, of 100 tablets, column two, the

greatest variation from the theoretical on the minus side The third column shows the difference of these extremes The last column contains the difference in variation of the extremes of 500 tablets from the preceding table

Commenting on this table, it will be seen that the difference in variation of each lot of tablets seems to remain quite constant, the percentage error depending upon the number of tablets produced from the several lots, as varying from the actual number of tablets to be made, and upon which each formula is based While the extremes of variations of these tablets, which consist principally of milk sugar, seem to be less than those found in morphine sulphate tablets,[1] the difference is not so great, that a statement of fact can be made, as so many factors enter into human workmanship A slight change in pressure of the operator in molding may change the entire calculation However, these figures may be taken as a general average, covering a considerable period of time, and for control work are very satisfactory

WHY TABLETS VARY

Referring to Table I, this relationship can be noted more clearly Those lots of tablets having an over yield in the number of tablets, show a percentage weight under the theoretical, which runs consistently throughout the entire lot The same is true of those lots producing an under yield, as shown by the percentages over the theoretical

As an example, let us consider the three lots of scopolamine hydrobromide The mass of each was made from the same formula, namely, Scopolamine Hydrobromide, U S P, 210 grains, milk sugar, 10,500 grains This mixture weighed 10,710 grains, to yield theoretically 21,000 tablets, each 100 to weigh 51 grains The material entering into each mass was obtained from the same source of supply, and in the preparation passed through the same process The tablets were molded by the same person, but at varying times These facts being considered, similar yields of tablets should be expected But instead of this, one mass produced 21,215 tablets, another 20,800 tablets and the third 20,330 tablets The data covering scopolamine hydrobromide are collected in Table IV

TABLE IV —SCOPOLAMINE HYDROBROMIDE TABLETS

Lot	Yield.	Per Cent	Extremes of 500 Tablets in Per Cent.	Extremes of 100 Tablets in Per Cent.
1	21,215	98 99	98 85 — 97 22	98 98 — 97 10
			Difference 1 63	Difference 1 88
2	20 800	100 96	101 87 — 97 02	102 17 — 96 48
			Difference 4 85	Difference 5 69
3	20,330	103 30	103 90 — 100 05	104 40 — 99 80
			Difference 3 85	Difference 4 60

A study of this table shows the difference in pressure exerted in molding, not only in the result of the entire lot, but in the component subdivisions as well While the three lots, taken as single units, have variations in per cent of 1 01 under, 0 96 over and 3 30 over, respectively, the subdivisions show extremes in percentages of 1 88, 5 69 and 4 60, respectively

This variation, both in yield and of the tablets in various lots, shows why a tolerance from the declared strength is necessary in the manufacture of tablets of

[1] JOUR A PH A, 23 (1934), 40

this nature This tolerance should be sufficiently large to cover uncontrollable factors that enter into the molding, but not too large as to impair the accuracy of dosage

This paper is not intended to offer any suggestions in the manufacture of hand molded hypodermic tablets It merely shows what variations take place in the molding of tablets by the comparison of various yields, and what problems confront the manufacturer, endeavoring to turn out a uniform product

ANALYTICAL AND CONTROL LABORATORY,
DIRECT SALES COMPANY, INC,
BUFFALO NEW YORK

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN OF ERROR IN DISPENSING IV PILLS

BY MARVIN J ANDREWS

(*Continued from page 1122, November Journal*)

For the purpose of making it possible to compare the results presented in Tables Nos I to III with similar data that may have been published, but which have not been expressed in terms of the standard deviation, the per cent of deviation from the average has been calculated and is given in Tables IV, V and VI

TABLE IV —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF PILLS PREPARED IN FILLING PRESCRIPTION No 1

Batch Number	Av Wt of Batch in Gm	Number of Pills in Each Batch That Deviate from the Average Weight by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
1	3 969	8	2			
2	3 873	10				
3	4 110	3	3	4		
4	3 532	6	3	1		
5	4 300	5	1	2	2	
6	3 725	10				
7	3 870	8	1	1		
8	3 594	2	7	1		
9	3 875	10				
10	3 650	3	2	3	2	
11	3 600	9	1			
12	3 540	7	2			1
13	3 475	6	1	2	1	
14	3 700	1	7	2		
15	3 577	4	3	3		
16	3 685	6	3	1		
17	3 680	3	5	2		
18	3 750	7	3			
19	3 770	4	2	2	2	
20	3 538	4	6			
21	3 402	4	4	2		
22	3 620	10				
23	4 483	7	2	1		
24	3 932	9			1	
25	3 573	10				
26	3 570	8	1		1	

27	3 563	8	1			1
28	3 740	9		1		
29	3 670	5	5			
30	3 770	7	3			
31	3 820	7	1	2		
32	3 730	4	3	3		
33	3 701	5	1	3	1	
34	3 280	7	3			
35	4 250	10				
36	4 100	10				
37	4 170	1	4	5		
38	3 342	10				
39	3 562	5	4	1		
40	3 492	3	2	2	2	1
41	3 620	2	5	1	2	
42	3 585	6	2	1	1	
43	3 677	6	4			
44	3 750	7	2	1		
45	4 001	5	3	1	1	
46	3 765	2	4	4		
47	3 595	3	4	2		1
48	3 680	5	4	1		
49	3 735	8	2			
50	3 940	3	5	2		
51	3 650	10				
52	3 500	6	2	2		
53	3 670	4	5	1		
54	3 591	3	7			
55	3 585	7	3			
56	3 572	4	4	2		
57	3 982	7	3			
58	3 575	7	3			
59	3 590	5	4	1		
60	3 530	6	1	1	1	1
61	3 575	10				
62	3 452	10				
63	3 439	5	4	1		
64	3 390	3	3	2	1	1
65	3 967	4	4	1	1	
66	3 590	6	2	2		
67	3 480	4	5	1		
68	3 735	7	2	1		
69	3 350	7	1	1	1	
70	3 652	5	2	2		1
71	3 350	8	1		1	
72	3 530	7	3			
73	3 395	3	3	2	2	
74	3 410	4	3	1	1	1
75	3 750	4	5	1		
76	3 900	8	1	1		
77	3 570	4	4	1	1	
78	3 685	8	2			
79	3 592	7	1	2		
80	3 550	10				
81	3 275	7	1	2		
82	3 970	3	3	4		

83	3 805	8	2			
84	3 370		7	3		
85	3 575	8	1	1		
86	3 460	5	2	2	1	
87	3 520	8		2		
88	3 750	5	3	1	1	
89	3 502	3	6	1		
90	3 540	10				
91	3 650	7	3			
92	3 490	8	2			
93	3 871	10				
94	3 565	6	2	2		
95	3 190	7	3			
96	3 580	6	4			
97	3 665	8	2			
98	3 502	5	2	2	1	
99	3 650	7	3			
100	3 530	4	2	2	2	
	Totals	610	247	105	30	8

TABLE V —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF PILLS PREPARED IN FILLING PRESCRIPTION No 2

Batch Number	Av Wt. of Batch in Gm	Number of Pills in Each Batch That Deviate from the Average Weight by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
1	4 352	7	2	1		
2	4 920	5	2	2	1	
3	4 675	7	2	1		
4	5 165	7	1	1	1	
5	5 015	7	3			
6	5 425	9	1			
7	4 430	5	2	3		
8	5 060	8	2			
9	4 820	8	2			
10	4 440	8	1	1		
11	4 470	6	3	1		
12	5 037	7	2	1		
13	4 950	10				
14	5 245	10				
15	4 992	5	4	1		
16	4 710	6	2	1	1	
17	4 520	4	6			
18	5 535	7	3			
19	5 852	3	6		1	
20	5 435	3	2	4		1
21	4 800	5	4	1		
22	5 110	6	4			
23	5 115	4	5	1		
24	5 655	3	5		1	1
25	4 835	10				
26	4 300	8	2			
27	4 097	5	2	2	1	
28	5 065	3	3	2	2	
29	5 560	5	5			
30	5 168	5	3	2		

31	4 840	8	1	1		
32	4 725	5	3	2		
33	4 600	5	2	3		
34	5 290	7	3			
35	4 757	5		4	1	
36	4 450	9	1			
37	3 150	10				
38	5 300	4	6			
39	5 469	8	2			
40	3 451	4	5	1		
41	4 652	6	2	1	1	
42	4 950	8	1	1		
43	4 660	7	2	1		
44	4 520	7	3			
45	5 000	5	5			
46	4 900	1	7	2		
47	4 895	7	3			
48	4 605	5	2	2	1	
49	4 757	3	5	2		
50	5 180	1	5	3		1
51	5 120	9	1			
52	4 945	7		2	1	
53	5 000	9				1
54	4 810	7	2	1		
55	5 075	7	3			
56	4 885	8	1	1		
57	5 100	5	3	2		
58	4 895	8	2			
59	4 950	7	3			
60	5 165	8		1	1	
61	4 975	10				
62	4 425	7	3			
63	5 090	7	1	1	1	
64	4 889	8	1	1		
65	4 795	6	3	1		
66	5 277	8	2			
67	4 387	8	2			
68	4 954	10				
69	4 647	4	3	2	1	
70	4 850	8	1	1		
71	4 845	5	5			
72	5 210	3	5		1	1
73	3 880	4	1	4	1	
74	4 420	3	5	2		
75	4 509	5		5		
76	4 390	6	2	1	1	
77	4 340	5	5			
78	4 800	9		1		
79	5 175	9	1			
80	5 020	3	7			
81	4 930	7	3			
82	4 740	8	1			
83	3 700		5	5		1
84	5 120	8	2			
85	4 890	7	1	2		
86	4 000	6	2	1	1	

87	5 100	7	1	1		1
88	4 640	2	7	1		
89	4 889	10				
90	4 825	6	3	1		
91	4 500	4	2	4		
92	4 840	10				
93	5 305	10				
94	6 755	9	1			
95	4 920	6	3	1		
96	4 650	3	1	4	1	1
97	4 550	4	4	1	1	
98	4 700	5	3	2		
99	4 360	6	2	2		
100	4 350	4	3	3		
	Totals	626	243	102	21	8

TABLE VI —PERCENTAGE DEVIATION FROM THE AVERAGE WEIGHT OF PILLS PREPARED IN FILLING PRESCRIPTION NO 3

Batch Number	Av Wt of Batch in Gm	Number of Pills in Each Batch That Deviate from the Average Weight by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	Over 20%
1	6 075	4	2	4		
2	3 865	10				
3	3 710	3	6	1		
4	7 010	7	3			
5	7 065	6	4			
6	5 015	6	1	2	1	
7	5 775	6	4			
8	5 260	7	1	1		1
9	5 460	8	1	1		
10	6 370	9	1			
11	5 075	10				
12	5 470	6	2	1	1	
13	5 097	5	3	1	1	
14	5 675	7	2		1	
15	6 750	9	1			
16	5 808	3	3	4		
17	5 042	8	2			
18	4 840	4	5	1		
19	5 300	6	3	1		
20	5 895	9		1		
21	6 246	7	3			
22	4 878	3	5	2		
23	5 604	5	4	1		
24	6 195	3	7			
25	6 552	5	2	3		
26	7 040	10				
27	3 890	6	2	1	1	
28	7 360	4	4	1	1	
29	5 450	5	2	2	1	
30	7 450	4	4	2		
31	7 380	10				
32	6 330	6	2	2		
33	6 437	8	1	1		
34	5 755	5	5			

35	6 473	6	2	1	1	
36	6 089	8	2			
37	7 120	10				
38	5 625	9	1			
39	5 110	2	8			
40	8 155	8		1		1
41	5 880	7	3			
42	5 702	4	3	2		1
43	5 230	5	5			
44	7 110	7	3			
45	5 667	2	7	1		
46	5 385	3	3	4		
47	5 150	8	1		1	
48	6 200	5	5			
49	5 210	5	4			1
50	6 100	6	4			
51	6 550	4	3	3		
52	3 300	10				
53	5 505	8	2			
54	4 900	10				
55	6 102	5	4	1		
56	5 680	7	3			
57	7 940	5	4	1		
58	8 870	7	3			
59	5 395	4	4	1	1	
60	5 360	7	3			
61	6 330	7		2		1
62	5 615	10				
63	5 620	8	2			
64	6 000	4	6			
65	5 900	8	1	1		
66	5 130	7	2	1		
67	4 350	7	2			1
68	4 790	10				
69	6 625	5	3	2		
70	4 620	10				
71	5 130	6	3	1		
72	5 670	9	1			
73	7 870	7	2	1		
74	6 445	4	3	1	2	
75	4 650	4	3	1	1	1
76	5 500	4	3	2	1	
77	5 176	8	1		1	
78	5 170	3	4	3		
79	5 670	5	5			
80	5 385	3	6	1		
81	5 960	8	2			
82	4 485	4	6			
83	5 675	6	3	1		
84	4 794	6	4			
85	5 330		5	5		
86	5 445	10				
87	4 640	4	4	2		
88	4 312	6	2	1	1	
89	4 900	5	4		1	
90	5 501	4	5	1		

91	4 834	10				
92	5 740	7	3			
93	4 005	6	2	1	1	
94	4 770	10				
95	7 908	10				
96	5 320	10				
97	5 960	6	1	1	1	1
98	4 310	5	4	1		
99	4 590	5	4			1
100	5 910	7	2	1		
Totals		634	260	78	19	9

It will be observed on examining Tables IV, V and VI that a variation of 15 per cent from the average weight will include the majority of all the pills compounded in this series of tests A summary of the results based on the per cent deviation from the average weight is given in Table VII

TABLE VII —SUMMARY OF RESULTS SHOWING THE NUMBER OF PILLS DEVIATING FROM THE AVERAGE WEIGHT AND THE PERCENTAGE OF DEVIATION

Prescription Number	Number of Pills Deviating from the Average Weight by— 5% or Less	From 5% Plus to 10%	From 10% Plus to 15%	From 15% Plus to 20%	20% or Over
1	610	247	105	30	8
2	626	243	102	21	8
3	632	262	78	19	9

The foregoing results compare favorably with those reported by Dr Robert L Swain in a paper entitled "Prescription Accuracy by State Board of Pharmacy Examinations—A Preliminary Study" (JOUR A PH A, 22 (1933), 1259) On calculating the percentage deviation based on the average weight of each batch of pills reported by Dr Swain to be satisfactory, we find that 82 8 per cent fell within 10 per cent, 13 6 per cent fell between 10 and 15 per cent, 2 5 per cent fell between 15 and 20 per cent, while the remaining 1 07 per cent were over 20 per cent

THE EFFECT OF TIME ON THE WEIGHT OF FRESHLY PREPARED PILLS

In the first series of tests the pills were weighed the same day they were prepared In this series of tests each batch of pills made for the first series of tests was weighed to determine the loss in weight on standing These pills had been stored in ordinary pasteboard pill boxes for periods of one and two weeks

The results of these weighings are given in Table VIII

TABLE VIII —AVERAGE WEIGHT OF 100 BATCHES OF PILLS AFTER STANDING FOR PERIODS OF 1 AND 2 WEEKS

Prescription Number	Average Weight of 100 Batches of 10 Pills Each on Day Prepared	1 Week Later	2 Weeks Later	Average Loss in Weight Over a Two-Week Period
1	3 659 Gm	3 292 Gm	3 204 Gm	0 455 Gm
2	4 795 Gm	4 771 Gm	4 731 Gm	0 064 Gm
3	5 689 Gm	5 601 Gm	5 501 Gm	0 189 Gm

CONCLUSIONS

1 The factors largely responsible for the variation in the weight of pills made by pharmacists are (1) the nature of the excipient used, (2) the amount of care exercised in compounding, and (3) the length of time which is permitted to elapse before the pills are weighed

The nature of the excipient used is not responsible for the variation in the weight of individual pills of the same batch, but is probably the principal cause for difference in the weight of batches of pills made by different individuals

2 From the data obtained in the tests made it would seem that twice the average standard deviation is a reasonable margin of error for weight This margin will cover 99 per cent of the batches of pills made in filling prescriptions Nos 1 and 3, and 96 per cent of the batches made in filling prescription No 2 Expressed in terms of percentage, a margin of error of 13 1 per cent variation from the average weight would cover all the above cases From this it is concluded that a margin of 15 per cent deviation from the average weight would be reasonable and should be permitted

(*To be continued*)

A STUDY OF THE EMPTYING TIME OF THE STOMACH WITH REFERENCE TO PILLS AND TABLETS *

BY F S BUKEY AND MARJORIE BREW

The results reported in this paper have been obtained from a rather extensive study of enteric coatings By use of the X-ray, many interesting facts were found concerning the length of time pills, tablets and capsules remain in the stomach

Early investigators have stated that pills would remain in the stomach from one to six hours However, the consensus of opinion was that from one to three hours was the normal emptying time The X-ray studies indicate that six hours is about the average emptying time

Apparently, size and shape of pills or tablets has little to do with the length of time they remain in the stomach Pills of 7 2 mm , 5 9 mm and 3 9 mm in diameter, and compressed tablets of 10 5 mm in diameter and 4 8 mm in thickness were used Also square tablets 10 mm by 10 mm and 5 mm in thickness and rectangular tablets 12 5 mm by 8 5 mm by 3 5 mm were given The tablet and pill masses contained $BaSO_4$ in order that they might be observed by X-ray In cases where the individuals were given nine pills, three of 7 2 mm in diameter, three of 5 9 mm in diameter and three of 3 9 mm in diameter, it was not uncommon to find that the larger pills left the stomach first

The subjects used in the study were normal and apparently in good health The same individual was used repeatedly in order to determine individual variation These individual variations made it almost impossible to state a general rule on

---

* Section on Practical Pharmacy and Dispensing A PH A , Washington meeting, 1934

emptying time It was found that the same subject given the same kind of pills on two different days, would react differently For example, subject L H was given three tablets and the X-ray pictures showed them to be out of the stomach in one hour On another day, the same subject was given five tablets of the same size and the X-ray pictures showed three tablets to be out of the stomach in four hours and the other two remained there for a longer period of time This variation was undoubtedly due to the condition of the individual, the type of food eaten and the concentration of gastric juices, for this reason, an emptying time constant for the individual is rather difficult to determine

A few experiments have been conducted using specific diets and the results indicated that the diet may have an influence upon the length of time pills, tablets and capsules will remain in the stomach Further study is being conducted on this phase of the problem

Several types of enteric coatings were studied Such coatings as salol-shellac, salol-balsam, keratin, stearic acid, stearic acid-carnauba wax and tolu were used in addition to the usual type of commercial enteric coatings Tolu coatings were not studied with the idea of determining their enteric value but to find whether they would disintegrate in the alimentary tract Very few pills or tablets with the tolu coatings disintegrated in the stomach, thus it made an excellent means of studying emptying time On abstracting the results of these experiments, it was evident that the type of coating has little to do with the time that pills, tablets or capsules will remain in the stomach

In this study 367 pills, tablets and capsules were given and 96 subjects were used The following table gives the number of subjects and the number of times they were used

TABLE I —NUMBER OF SUBJECTS, TIMES USED

Number Subjects	Times Used	Number Subjects	Times Used
16	1	5	4
12	2	2	5
6	3	1	8

The following table gives the emptying time in hours for tablets, pills and capsules of the indicated dimensions with no regard to the type of coating

TABLE II —EMPTYING TIME IN HOURS

Type.	Size in Mm	No of Pills Out of the Stomach at the End of the Listed Hours. 2	3	4	5	6	7	8	9	10	11	12	15	17	19	21
Tablets	10 5 x 4 8	15	39	37	14	12	3	3	0	4	0	0	0	0	0	0
Capsules	18 3 x 5 9	0	3	2	3	0	1	0	0	0	0	0	0	0	0	0
Pills	7 2	13	10	2	1	1	2	0	1	0	0	0	0	0	0	0
Pills	5 9	5	4	5	3	0	1	0	0	0	0	0	0	0	0	0
Pills	3 9	2	0	0	4	0	3	3	0	0	0	0	0	0	0	0
Pills	6	0	10	20	28	6	9	0	3	8	18	5	1	12	10	1
Tablets (sq)	10 x 10 x 5	8	4	0	5	3	0	0	0	0	0	0	0	0	0	0
Tablets (rect)	12 5x8 5x3 5	15	0	5	0	0	0	0	0	0	0	0	0	0	0	0

The following table gives the total number of pills, tablets and capsules which were out of the stomach at the end of the stated time with no respect to the shape or enteric coating

TABLE III —TIME OUT OF STOMACH

Number	Hours	Number	Hours
58	2	4	9
70	3	12	10
71	4	18	11
58	5	5	15
22	6	12	17
19	7	10	19
6	8	1	21

The largest number of pills passed out of the stomach in four hours, but the average emptying time calculated from this table was found to be five and nine-tenths hours

The following table gives the emptying time in hours for pills and tablets based upon the type of enteric coating used with no regard to size

TABLE IV

Type of Coating	No of Pills Out of the Stomach at the End of the Listed Hours																			
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Tolu (S B Penick)	0	0	1	5	0	2	0	3	0	0	5	0	0	0	0	0	0	4	0	1
Tolu (Huisking)	0	10	0	10	0	5	0	1	3	7	0	0	0	1	0	2	0	4	0	0
Tolu (Eimer & Amend)	0	0	7	17	0	3	0	0	4	0	0	0	0	0	0	9	0	0	0	0
Tolu (Hopkins)	0	0	12	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0
Keratin	0	1	0	3	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
Stearic acid	0	6	9	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salol Balsam	5	12	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salol Shellac	2	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Carnauba wax and stearic acid	11	4	9	3	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0

Several conclusions have been drawn from this study *First*, that the size and shape of a pill, tablet or capsule have no effect on the length of time it will remain in the stomach *Second*, that the same individual does not react uniformly toward this type of medication with reference to emptying time *Third*, that indications point to the fact that the emptying time may be influenced by the type of diet *Fourth*, that the type of enteric coating does not have any effect on the length of time that pills, tablets and capsules will remain in the stomach

COLLEGE OF PHARMACY,
UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA

PRESCRIPTION PROBLEMS *

BY S W MORRISON

A large number of interesting prescriptions has been collected from the files of the Illinois Research Hospital, a few of which are presented in this article Each one presents some difficulty which can be remedied, instead of compounding as written and dispensing a disagreeable-looking prescription

℞ 1

Lugol's Solution	20 0
Compound Elixir of Pepsin *q s*	120 0

* Section on Practical Pharmacy and Dispensing, A PH A, Washington meeting 1934

An opaque colloidal precipitate of brown color is produced, giving an unsightly appearance The remedy is to add 15 cc of alcohol to the Lugol's Solution before adding the compound elixir of pepsin A clear solution is obtained

℞ 2	Sodium Bromide	35 0
	Compound Elixir of Pepsin *q s*	120 0

The sodium bromide dissolves easily in the elixir but after standing a few hours a flocculent precipitate forms This is due to the salting-out action of the bromide and will not obtain in dilute solutions The precipitation can be prevented by dissolving the sodium bromide in 35 cc of water before adding the elixir

℞ 3	Salicylic Acid	0 6
	Coal Tar Solution	4 0
	White Lotion	60 0
	Water *q s*	120 0

This prescription was filled by dissolving the salicylic acid in the coal tar solution, then adding the other ingredients A coarse brown precipitate of the tarry matter formed, possibly due to the acidity of the salicylic acid The only way the prescription can be satisfactorily filled is to mix the coal tar solution with the water and the white lotion and then triturate this with the salicylic acid in a mortar No precipitate occurs and a uniform smooth lotion can be dispensed Perhaps it is because the salicylic acid is not in solution and does not increase the acidity of the solution

℞ 4	Corrosive Mercuric Chloride	gr VI
	Dilute Acetic Acid	ʒ ss
	Sodium Borate	ʒ ss
	Glycerin	ʒ IV
	Alcohol	ʒ III
	Water *q s*	fl oz IV

This prescription will usually produce a yellow to red precipitate of HgO, depending on the manner of mixing A clear colorless solution is obtainable if the corrosive mercuric chloride and 6 grains of sodium chloride are dissolved in some of the water and the acid added The sodium borate is then dissolved in the glycerin and a portion of the water, this is mixed with the solution of the mercuric chloride, the alcohol is added and sufficient water to make the required volume The sodium chloride decreases the ionization of the mercuric chloride, thereby preventing reaction and precipitation of the mercury Addition of hydrochloric acid instead of sodium chloride will likewise give a clear solution

℞ 5	Amidopyrine	7 0
	Chloral Hydrate	5 0
	Syrup of Citric Acid	30 0
	Water *q s*	90 0

No matter how these ingredients are combined an oily-like mixture separates and settles to the bottom Chloral hydrate is soluble in oil, and amidopyrine is insoluble in oil An emulsion was made, hoping that the combining of the chloral

hydrate with the amidopyrine might thereby be prevented The chloral hydrate was dissolved in 10 cc of olive oil and mixed with 4 Gm of acacia The amidopyrine was dissolved in the water and syrup with the aid of heat The aqueous solution was added to the oil solution and an emulsion made by means of the syringe method, which proved to be the best procedure The mixture of the liquids was drawn up into a 50-cc Leur syringe, then forced out again This operation was repeated 6 or 7 times and a perfect emulsion formed It gave a white milky preparation which did not separate after standing 3 days

The advantage of the syringe method is that less acacia is required, no definite proportion of oil, water and emulsifying agent is necessary and the method never fails The only precaution necessary is in the trituration of the acacia with the oil, so that there will be no lumps to obstruct the opening of the syringe This improved method can be recommended for a place in the N F VI, instead of the present procedure

℞ 6	Sodium Salicylate	15 0
	Citric Acid	0 6
	Tincture of Ferric Chloride	15 0
	Glycerin	60 0
	Methyl Salicylate	1 2
	Solution of Ammonium Acetate *q s*	120 0

This prescription resulted in a dark colored mixture with a dark gelatinous precipitate of ferric salicylate A more pleasing preparation can be obtained by substituting Tincture of Ferric Citrochloride A clear solution is obtained without the precipitate and dark color

℞ 7	Sodium Bromide	15 0
	Tincture of Belladonna	15 0
	Kaolin	4 0
	Liquid Petrolatum *q s*	120 0

At first glance this appears to be an impossible combination as none of the ingredients are soluble or miscible with each other However, a very satisfactory preparation can be made by adding acacia and water and making an emulsion which will be homogeneous and will not readily separate The kaolin and 4 Gm of acacia were triturated with some of the liquid petrolatum The tincture was diluted with 10 cc of water and the bromide dissolved in it This solution was then added to the liquid petrolatum mixture and an emulsion prepared by the syringe method described under prescription No 5

℞ 8	Morphine Sulphate	0 3
	Sodium Iodide	5 0
	Bismuth Subnitrate	6 0
	Divide in chart No 12	

When these salts were triturated together in a mortar, the mixture immediately turned to a brick-red color This is due to the presence of moisture and reaction of the sodium iodide with the bismuth subnitrate, forming bismuth oxyiodide Even when mixed lightly with a spatula without trituration the mixture gradually

turned to a yellowish orange color It is desirable to dispense these powders without decomposition and the addition of 5 Gm of dried starch to the mixture will prevent the reaction and change in color However, the mixture should not be triturated in a mortar

UNIVERSITY OF ILLINOIS,
COLLEGE OF PHARMACY

U S P AND N F PUBLICITY IN MARYLAND *

BY FRANK L BLACK

There has been a great amount of enthusiasm shown in the revival of the use of U S P and N F preparations Back in 1930, Lawrence S Williams, president of the Maryland Pharmaceutical Association, advocated in his retiring speech the forming of a committee to study the U S P and N F Propaganda The incoming president appointed Mr Williams chairman of this committee They worked for two years under Presidents Spire and Kantner and made some progress

L S Williams had to resign due to ill health and, in 1933, President L V Johnson appointed a new committee of eight, who selected Marvin J Andrews as its chairman [1]

The first meeting of the new committee was held on August 16, 1933, when plans were formulated for the type of work to be done It was decided at this meeting that mimeographed letters be sent to every physician in the City of Baltimore and the counties of Maryland These letters were to consist *first*, of general information on the U S P and N F , *second*, arguments to induce the physicians to prescribe U S P and N F drugs and preparations, and *third*, such other material that the committee may decide upon

It was also decided that with each letter at least eight or ten seasonable prescriptions be included, titled as to their use This letter and the list of prescriptions were to be published in the *Maryland Pharmacist*, one month before mailing them to the physicians, so that every pharmacist would be enlightened as to what was being done, with the exception that the use for which these prescriptions were intended would not be mentioned in the *Journal* in order that physicians could not come back with the suggestion that pharmacists were employing these formulas for counter-prescribing

It was proposed to send out a series of six such letters and lists of prescriptions at intervals of one month Then came the task of financing this proposition After very careful study the cost for completing the work was ascertained to be about $575 00 to $600 00, which included stationery, mimeographed letters, printing of prescription formulas and postage, there are about 200 physicians in Baltimore and in the state of Maryland

The state and city associations had appropriated a sum of money at the first announcement of this project, but due to the financial loss and depression they were not able to make the full payment Maryland Pharmaceutical Association

* Section on Practical Pharmacy and Dispensing, A PH A Washington meeting, 1934

[1] Assistant Professor of Pharmacy at the School of Pharmacy of the University of Maryland

holds a spring and a fall regional meeting independent of the yearly convention, on October 17, 1933, at the Hagerstown regional meeting, it was proposed and passed that a letter should be mailed to every pharmacy in Maryland, asking for a donation of one dollar There were about 75 members present at this meeting and about sixty-five dollars were collected before adjournment

On November 1st, the appeal requesting this donation was mailed to every pharmacy, and to date about $400 00 has been collected The outcome of this appeal for one dollar was somewhat of a surprise, as it was expected to receive at least 90 or 95% of replies from the independents and little or no support from the chain organizations, however, the chains responded 100% and the responses from the independents was below the expectancy This loss being observed, the Baltimore Retail Druggists' Association formed a committee to canvass every drug store in Baltimore that had not subscribed, and to date the result has been very satisfactory

There have been a number of joint meetings of the pharmaceutical bodies with the doctors and on each occasion some comment was made of the value of the U S P and N F

It is gratifying that the *Maryland Pharmacist* has been good enough to give the space of two pages or more for this work The second mailing has just been completed and responsive thereto a number of very complimentary letters from medical friends have been received and the results of the undertaking are very encouraging

NOTE Reprints and formulas accompanied the paper, also copies of an address on U S P and N F—Their Relationship to the Cost of Medical Care," by R L Swain delivered before the Maryland Academy of Medicine and Surgery, January 16, 1934 reprinted from the *Maryland Pharmacist*, February 1934

Accompanying a series of prescriptions (exhibited with the paper) mailed to physicians it was stated

The purpose of sending you these prescriptions is to direct your attention to some of the useful combinations which can be made from items official in the Pharmacopœia of the United States and the National Formulary with the hope that you may be induced to make more frequent use of these standard works in writing your prescriptions If you have any criticisms to make of the above prescriptions or any suggestions to offer as to other means by which we may accomplish our purpose, it will be appreciated if you will communicate them to the Committee

Prepared under the auspices of the U S P and N F Publicity Committee of the Maryland Pharmaceutical Association and the Baltimore Retail Druggists' Association "

(*Signed*) MARVIN J ANDREWS, *Chairman*

THE PHARMACEUTICAL POSSIBILITIES OF DENTAL SUPPLIES *

BY LEON RICHARDS [1]

The potential possibilities in the field of dental supplies are worthy of considerable attention by the present-day pharmacist This opportunity of mutual benefit by the cooperation of the professions of dentistry and pharmacy demands more than casual interest It is not a new idea, but the advantages to be gained from this cooperative effort seemingly need more emphasis The knowledge and services of both groups are not being utilized to the extent they should be

* Section on Practical Pharmacy and Dispensing, A PH A , Washington meeting 1934

[1] Assistant Professor of Pharmacy, University of Montana

It can hardly be disputed that the dentists are required to pay exorbitant prices for a number of relatively simple mixtures masquerading under meaningless, high-sounding titles This exploitation, by some manufacturers, has created an antagonistic reaction within the profession and the dentists are a ready market for the pharmacist seeking new fields for his professional services

There are a large number of secret formula preparations being sold to the dentists by supply houses that can be successfully replaced by official preparations, or materials prepared from recognized formulas The scientific background of the pharmacist especially equips him for this specialized work and he should avail himself of this opportunity to increase the scope of his professional services

Frequently, the practitioner unknowingly has been imposed upon by some of the manufacturers Certain dental supply houses and nostrum dealers have persistently foisted harmful preparations on the public and the dental profession in the guise of beneficial remedies The hydrochloric acid tooth stain removers are outstanding examples of this type of preparations, some of them have been found by chemical examination, to be strong hydrochloric acid solutions—a rather important matter which some supply house salesmen have neglected to mention

The remedy for this situation has been suggested by the Council on Dental Therapeutics of the A D A , it is for the purpose of correcting this condition that they publish from time to time critical reports on various products submitted to them for approval and recommend that U S P and N F materials be used whenever possible Many outstanding men in their profession have courageously pointed the way Dr Harold S Smith (1), chairman of the Council, in his article entitled, "Dental Proprietary Remedies and Nostrums," states

'Many of these remedies are secret formulas carrying some fancy copyrighted name, and carrying, in some cases, in the literature accompanying them, therapeutic claims which may not be supported by scientific evidence This situation would not exist if the therapeutic training of the dentist were adequate If it were adequate he would consult the U S P and N F regarding the therapeutic agents required, and secure them on the basis of rational costs, rather than on the tremendously inflated prices of the proprietary formulas "

This work of the Council has been supplemented by various papers that have pointed out official materials especially applicable for dental use For example, Aaron Isaacs (2), associate chemist of the Bureau of Standards, comments on mercury as follows

'Many different terms such as pure, chemically pure, distilled, redistilled, double distilled and U S P are used to designate the quality of mercury—none of these terms has a definite meaning except the term U S P and the requirements given in the U S Pharmacopœia are entirely adequate for mercury to be used in dentistry "

The fact that a busy dentist does not have time, nor possess the specialized training necessary to evaluate new drugs tends to emphasize the dependability of the official products However, the average practitioner needs to be more fully informed concerning the individual materials that he can utilize in his office Therefore, the pharmacist should detail his dentists on the specific materials that he is able to supply them at reasonable prices

To this end there are listed below as suggestions, a few of the more common materials found in dental offices

1 Arsphenamine U S P, in the treatment of Vincent's disease
2 Howe's Ammoniacal Silver Nitrate Solution (3), to retard the progress of dental decay
3 Compound Choroformic Solution of Mastic, N F V, pulp capping
4 Chloroformic Solution of Rosin, N F V, pulp capping
5 Dental Polishing Paste (Mickelsen) (4), professional use only
6 Compound Dental Liniment of Aconite, counter-irritant for relieving pain involving the gums
7 Compound Dental Liniment of Aconite and Iodine N F V, used on the gums as a refrigerant counter irritant
8 Eugenol U S P, reducing agent
9 Formaldehyde U S P, reducing agent
10 Toothache Remedy N F V, Black's well known 1-2 3 mixture
11 Liquefied phenol U S P devitalizing agent
12 Mercury U S P, amalgams
13 Compound Solution of Iodine U S P, disclosing agent
14 Tincture of Iodine U S P, counter-irritant and antiseptic
15 Sodium Perborate, treatment of Vincent's disease

REFERENCES

(1) Smith, *Jour A D A*, 18 (April 1931) 637
(2) Isaacs, *Ibid*, 19 (January 1932), 54
(3) Gorden, *Ibid* 20 (March 1933), 530
(4) Mickelsen, JOUR A PH A 22 (November 1933), 1115

HOSPITAL PHARMACY *

BY RICHARD D FRANKLIN [1]

MANUFACTURING

The amount of manufacturing to be regarded as advisable depends largely upon the number of prescriptions dispensed and the number of pharmacists employed For a small hospital with only one pharmacist it is often advantageous to buy most of the finished preparations Our hospital has a capacity of about 300 beds, and treated 35,000 out-patients during the past year We have found it profitable to manufacture many of the official and non-official elixirs, ointments, mixtures and solutions, but deem it advisable to buy many other preparations, such as assayed tinctures and fluidextracts, ampuls of various medicinal substances, and all tablets and pills In other words, the simpler preparations can be made in the pharmacy, while those requiring more elaborate equipment, or better suited to mass production, should be purchased

PURCHASING

Purchasing merits the personal attention of the pharmacist, and should not be left entirely to the purchasing agent Quality and service are most important,

* Charles V Chapin Hospital located in Providence, R I, was formerly known as the Providence City Hospital, the name was changed in December 1931, in honor of Charles V Chapin M D, who was for forty eight years Superintendent of Health of Providence The hospital was primarily, for infectious diseases, but tubercular and neuropsychiatric patients are treated also

[1] Assistant Professor of Operative Pharmacy at the Rhode Island College of Pharmacy, Providence, R I

and it is, therefore, poor economy to deal with houses that have been found to be unreliable as to quality of goods, or promptness of delivery

DISTRIBUTION TO WARDS

Most of the requisitions from the wards come in early, and can usually be filled before the prescriptions from the out-patient department begin to arrive All preparations are dispensed in bottles or jars, wide-mouth bottles for tablets, pills and powders, and narrow-mouth for liquids The glass may be white or amber, depending on the preparation and the necessity for protecting it from light Such bottles are inexpensive and much more satisfactory than paper or card-board containers

The label carries the name of the medication, the date and the initials of the pharmacist who is responsible Materials known to deteriorate are issued in small quantities, with an additional label calling attention to the expiration date, or the date on which any remaining material is to be returned to the drug room Tincture of digitalis, for example, when issued to the wards is given a month's dating, if any is returned, it may, if approved, be dispensed to the out-patients Silver colloids and alkaloids without preservative are returned in two weeks Wards are inspected periodically to prevent overstocking and the accumulation of out-dated preparations

A complete record of each prescription is filed, as in any modern retail pharmacy This record contains the name, address and age of the patient, together with the prescription number Prior to 1930 about eighty per cent of our out-patients paid for their prescriptions, but during the last three years the number of patients paying for their medicine has dropped to about ten per cent The resident physician in charge of the out-patient department, with the assistance of the social service department, investigates all cases before deciding that they are unable to pay, and signs all prescriptions that are to be dispensed free We do not feel that we are competing unfairly with retail pharmacists, for, although we may cut in on a small amount of their paying business, we save them far more by taking care of those who cannot pay cash, and from whom collection would be difficult and in many cases impossible During the last calendar year we have dispensed 30,000 prescriptions to out-patients and the needy and unemployed of the city of Providence, at an average cost of about twenty-five cents

While we have our own hospital formulary and find it useful in many ways, the greater part of our prescription work is entirely individual Considerable time could be saved by the use of stock mixtures but, in general, individual prescriptions are to be regarded as more desirable

The hospital employs three registered pharmacists, all graduates of the R I College of Pharmacy, one assistant, one student pharmacist and one porter The pharmacist who fills a prescription is responsible for that prescription, as we employ no checking system We feel that the advantage to be gained by having a second man check the prescription is fully offset by the tendency of the system to divide responsibility, and that the extra work and expense are therefore not justified The drug department is open from 8 30 A M to 9 00 P M daily, including Sundays and holidays Each pharmacist works about 50 hours per week Clinics are also conducted by the hospital in two different sections of the city These

clinics are pediatric in nature, and one of our pharmacists is always in attendance during clinic hours All packages are wrapped before being sent out

DISPENSING MEDICINES TO THE NEEDY, AND METHODS OF HANDLING RELIEF WORK

One full-time and several part-time physicians are employed by the city to care for those unable to pay Prior to 1932 many retail stores furnished free medicine to such patients, but in 1932 the increasing number of free prescriptions forced them to abandon this practice, and the city had to take up the work The city physicians carry small supplies of drugs, furnished by the city, for emergency use When they find it necessary to write prescriptions they adhere as closely as possible to standard and official drugs At first the cost was borne by the Health Department, but in January of 1933 the Department of Public Aid assumed the expense for prescriptions issued to patients coming under the heading of "Unemployed Relief" and "C W A " workers These are accompanied by a letter of identification from a social service worker connected with the Department of Public Aid Since the establishment of the F E R A the system has been changed in that patients are allowed to call their own physicians, at the expense of the Department of Public Aid As a result, costs have greatly increased, for about 75 per cent of the prescriptions are for proprietary medicines, many of which cost from $1 00 to $2 50 As the matter of dispensing now stands, the Health Department pays the needy sick who are too enfeebled to work and those who would have no means of support even if times were better The Department of Public Aid, through City and Government appropriations, pays the cost of medicines issued to the unemployed and F E R A workers

LABELING

The label carries the serial number of the prescription, the date, directions and signature or initials of the pharmacist who is responsible In order to discourage self-medication, as well as to save the patient possible embarrassment, names of medicines and formula numbers are not, as a rule, put on the label

VALUE AND USE OF A HOSPITAL FORMULARY

A hospital formulary can be of distinct value if it is kept up-to-date by regular revision, and if the physicians are familiar with its contents The point to be borne in mind is that the formulary should not be followed too slavishly The physician should be encouraged to write individual prescriptions when, in his opinion, such prescriptions are indicated Individual attention to prescriptions is especially important in the departments of Internal Medicine, Dermatology and Gastro-Enterology This practice of course increases the amount of work, and can be overdone, but the physicians who are giving their time to the free clinics deserve all the cooperation we can reasonably give them The Council of Chemistry and Pharmacy of the American Medical Association has repeatedly gone on record against the abuse of the practice of prescribing of medicine in fixed doses to group patients The difference between the individual prescription and that of the formulary is often quantitative rather than qualitative The common "Sippy" powder, for example, may contain too much magnesium oxide for some patients

REFILLS

Out-patients are not allowed refills without an order from a physician connected with the department from which the original prescription was obtained The same rule applies to patients from the Department of Public Aid, if the preparation contains a potent drug, if no such drug is present two refills are allowed

EXPERIMENTAL USE OF NEW DRUGS AND REMEDIES

The policy of the hospital administration toward new drugs and remedies is thus expressed by Dr Richardson

There are on the market many useful drugs and chemicals, not listed in the United States Pharmacopœia or National Formulary, which are being tried out, and new ones are constantly appearing They are either preparations recognized by the Pharmacopœia or Formulary, and sold under trade names, or they are slight variations from such recognized preparations, and are given new trade names Offered under trade names, these preparations are sold at much higher cost than is warranted by cost of manufacture In many instances, if the prescription bears the name of a chemical the price is much less than when it bears a trade name Many of these new drugs are of no more value than are other less expensive drugs Physicians are constantly being solicited by detail men to try these expensive preparations, and too often they are persuaded to do so

"Certainly, progress is being made in drugs and chemicals for the treatment of illness, but physicians should be careful not to saddle unnecessary cost on their patients for new and unproven preparations Expensive drugs, unless they are absolutely needed, should not be prescribed for poor people and persons who are on the public relief, and which must be paid for by public funds Intelligent prescription writing is fast becoming a lost art "

NARCOTIC RECORDS

A separate numbering system is used for prescriptions containing narcotics No refills are allowed without a new prescription The nurse in charge of a ward can requisition narcotics from the drug department She must, however, report on a narcotic blank all drugs and the number of doses given the patient during the preceding 24 hours, this report is sent to the drug department daily In conjunction with this, a physician must sign, in a special book, for all narcotics given on the ward If the nurse desires more narcotics she must order the quantity desired and report the balance left from the previous order, and this must correspond with the total quantity first issued Furthermore, the physician's order book is checked with the nurse's report We limit denominations of narcotics to those most frequently used on the wards We dispense H T morphine sulphate in $^1/_4$-grain or $^1/_8$-grain tablets, the same for H T codeine sulphate If any doses are needed above or below these quantities they can easily be derived from them There may be a little waste at times, but this is more than compensated for by not having to stock an unnecessarily large number of denominations

---

NEW YORK DENTAL SOCIETIES

New York Dental Societies on December 3rd observed the centennial of the world's first dental society—the Society of Surgeon Dentists of the City and State of New York They also commemorated the 200th anniversary of the first known practice of dentistry in this country as a profession The first two practitioners were, according to the centennial announcement, Drs James Reading and James Mills, both of whom began their dental practice in New York in 1734

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS DEPARTMENT

A definite statement by an authority of what a college course should embrace is welcomed by all teachers of that subject The study of applied botany, applied chemistry, applied physiology, as well as applied physics, is quite important in building such a professional curriculum as that of pharmacy The leaf is the most important biochemical laboratory contributing to the welfare of man, and not only deserves considerable attention but should be a means of interesting students in botany Several important drugs consist either of leaves themselves, or the active principles of leaves and therefore deserve particular attention in botany applied to pharmacy as well as in pharmacognosy The following paper by Dr Youngken will interest all teachers of botany —C B JORDAN, *Editor*

THE STUDY OF THE LEAF

BY HEBER W YOUNGKEN *

Botany, like chemistry, has long been recognized as fundamental to the proper understanding of Pharmacognosy and Pharmacy One of its most alluring phases is that dealing with the study of the leaf The leaf and the flower are the two most necessary parts to have in hand in making certain and ready identification of an unknown plant Of the many vegetable drugs, leaves rank second in number only to roots so that the importance of their fundamental study is obvious

In the education of students of Pharmacy are we to look upon Botany merely as an academic course or are we to continue to recognize that, in addition to its cultural value, it has its professional pharmaceutical side which, if developed with the student by properly coordinating it with Pharmacognosy, will be of inestimable value when he comes to pursue the professional course in the latter subject?

Let us examine the content of each of two courses on the leaf phase of Botany, the first a typical academic course, the second a typical pharmaceutical one

OUTLINE OF THE STUDY OF THE LEAF (ACADEMIC COURSE, 1ST YEAR BOTANY)

1 DEFINITION Origin and Development of Leaves

2 OUTER MORPHOLOGY OF THE LEAF—Leaf blade, petiole stipules, venation simple leaf, compound leaf (pinnately and palmately compound), leaflets, leaves of different forms on the same plant (heterophylly)

3 MICROSCOPIC ANATOMY OF THE LEAF (*a*) Anatomy of blade of dorsiventral leaf (*b*) Anatomy of petiole of dorsiventral leaf

4 PHYSIOLOGY OF THE LEAF

A Photosynthesis (*a*) Raw materials (*b*) Sunlight the energy factor Relative effectiveness of different parts of the spectrum (*c*) Function of chlorophyll (*d*) Efficiency of the leaf in utilizing the sun's energy Measurements of the quantity of light energy which is absorbed by the leaf and of the quantity which is utilized in photosynthesis Demonstration, using a variegated leaf (*e*) By product (*f*) End products (*g*) Rate of carbohydrate production (*h*) Conditions influencing the rate of photosynthesis (*i*) Utilization of the product of photosynthesis

B Transpiration (Experiment with potted plant using bell jar Experiment with Potometer in measuring rate of transpiration)

* Professor of Botany and Materia Medica Massachusetts College of Pharmacy, Boston

(*a*) Definition (*b*) Utility to the plant (*c*) The transpiration stream (*d*) Cooling effect of transpiration (*e*) Conditions affecting transpiration rate (External and internal conditions) (*f*) Other conditions of reducing transpiration

C Respiration in leaves.

D Autumnal coloration of leaves including conditions favoring the production of anthocyanins

E Special functions sometimes performed by leaves (Protections by bud scales, spines, water storage, food storage, attachment by tendrils, capture of insects)

5 LABORATORY STUDIES mainly devoted to experiments in plant physiology with little microscopic work of elementary character

OUTLINE OF THE STUDY OF THE LEAF (PHARMACEUTICAL COURSE)

1 DEFINITION OF LEAF Outstanding Leaf Drugs

2 THE COMPLETE LEAF (*a*) Leaf blade—general structure of lamina (*b*) Petiole—petiolate and sessile leaves (*c*) Stipules—stipulate and exstipulate leaves

3 LEAF FUNCTIONS (*a*) Photosynthesis (Materials, energy factor, end products) Demonstration of photosynthesis using variegated leaf (*b*) Assimilation (Utilization of the product of photosynthesis) (*c*) Respiration (*d*) Transpiration Demonstration, using potometer

4 TYPES OF LEAVES DEVELOPED IN ANGIOSPERMS

5 ORIGIN AND DEVELOPMENT OF LEAVES

6 PHYLLOTOXY—Terms referring to forms of leaf arrangement, including alternate, opposite verticillate, decussate and fascicled

7 VERNATION—Forms of leaf folding in bud

8 LEAF VENATION—Mid rib or primary vein, middle primary lateral primaries kinds of venation furcate, parallel reticulate, pinnately veined, palmately veined, pinnate reticulate palmate reticulate, anastomosing tessellated and impressed

9 LEAF INSERTION—Terms referable to leaf insertion including radical, cauline, ramal perfoliate, amplexicaul, connate perfoliate, equitant

10 FORMS OF LEAVES (*a*) Simple leaf defined (*b*) Compound leaf defined, pinnately and palmately compound leaves (leaflets, petiolule rachis)

11 FORMS OF LAMINA with terms referable to each subhead as follows General Outline Apex Base, Margin Lobing of Lamina and Transition to Compound Leaf

12 FORMS OF PINNATELY COMPOUND LEAVES

13 FORMS OF PALMATELY COMPOUND LEAVES

14 LEAF MODIFICATIONS

15 LEAF TEXTURE—Terms referable to, as membranous, succulent and coriaceous

16 LEAF COLOR

17 LEAF SURFACE—Terms referable to, as pellucid punctate, glabrous, pubescent, tomentose, scabrous, etc

18 DURATION OF LEAVES—Terms referable to

19 GROSS STRUCTURE AND HISTOLOGY OF THE PETIOLE (*a*) The pulvinus and stalk portions and shapes of petioles (*b*) Sheathing petioles—Pericladium (*c*) The Phyllode (*d*) Histology of monocotyl and dicotyl petioles

20 STIPULES Definition Forms of lateral and axillary stipules The ligule and ochrea Modified stipules

21 GROSS STRUCTURE AND HISTOLOGY OF THE LAMINA (*a*) Dorsiventral types including hydrophytic mesophytic and xerophytic (*b*) Bifacial type (*c*) Centric types including xerophytic and succulent (*d*) Study of a powdered leaf drug

22 STRUCTURE AND DEVELOPMENT OF STOMATA Neighboring cells

23 LABORATORY STUDIES—the gross morphology and histology of leaves of medicinal and horticultural plants Demonstration of the leaf drugs of the U S P and N F as well as some unofficial ones Leaf fibres as Sansevieria, etc

A careful examination of the outlines presented here, the first of a general university academic course in botany, the second of a course in botany given in a pharmaceutical college or in a college of pharmacy of some universities where morphology is emphasized, will reveal the fact that in the former, plant physiology is emphasized with hardly sufficient plant morphology for the proper understanding of physiology, whereas in the latter, plant morphology receives the greater emphasis with sufficient plant physiology and ecology for their broadening value, for holding the interest of students during the presentation of the subject and for the needs of the average pharmaceutical career

---

PHARMACY AND THE COMMITTEE ON ECONOMIC SECURITY

BY ROBERT P FISCHELIS *

IN THE near future President Roosevelt's Committee on Economic Security will present plans upon which the Congress will base legislation pertaining to unemployment insurance, old-age pensions and possibly sickness insurance and other social welfare projects

Announcement has been made of the selection of a Medical Advisory Committee to cooperate with the Committee on Economic Security on problems involving the practice of medicine Some concern has been expressed by pharmacists that no one representing pharmacy has a place on this Advisory Committee and that no Pharmaceutical Advisory Committee has been appointed

So that the members of the AMERICAN PHARMACEUTICAL ASSOCIATION and others interested may know that we have not been unmindful of the opportunity for cooperating with the Government in matters of public concern which may or may not affect the practice of pharmacy, we present the following information

Early in October the writer was called into conference with members of the staff of the Committee on Economic Security to discuss pharmaceutical phases of health insurance At that time the Committee on Economic Security was exploring the entire field of social insurance and information was sought from the various health professions with regard to problems that would affect them We supplied the Committee with the information it asked for It was pointed out to us that the Committee would seek further information if and when it became apparent that health insurance was to be a part of the administration's legislative program A definite promise was made to the writer at that time that a representative group of pharmacists would be sought to advise the Committee on Economic Security with reference to the pharmaceutical phases of any program that may be developed Further contact with the Committee indicates that the program has not reached a stage requiring our cooperation Physicians are of course concerned with old-age pensions and other social legislation as well as health insurance The Medical Advisory Committee was therefore appointed earlier

With assurances that we shall be called upon to give advice when health in-

* President AMERICAN PHARMACEUTICAL ASSOCIATION

surance is definitely considered, it becomes necessary to collect and classify all available information on the subject so that we may be able to comment intelligently on the Government's proposals and offer constructive suggestions for improvement over the various systems in vogue in foreign countries

Unfortunately we have not gone as far as the medical and dental professions in obtaining such information The National Associations representing these professions have financed surveys of health insurance made right on the ground in various foreign countries where such systems are in vogue Various County and State medical and dental societies have had committees at work studying such projects and the general field of social welfare legislation In some States, pharmaceutical associations have done likewise

The experiences of pharmaceutical associations in the various States with emergency relief and the information obtainable from pharmacists who have worked under health insurance systems in foreign countries should be collected at once and forwarded to the Washington Headquarters of the AMERICAN PHARMACEUTICAL ASSOCIATION for coordination The cooperation of all State and Local Associations in this endeavor is earnestly solicited

---

DRUG ADDICTION COMMITTEE, NATIONAL RESEARCH COUNCIL

The members of the Drug Addiction Committee, National Research Council are Dr William Charles White, National Institute of Health, U S Public Health Service chairman, H J Anslinger, U S Commissioner of Narcotics Prof Charles W Edmunds University of Michigan, Dr Ludvig Hektoen, Director, McCormick Institute for Infectious Diseases, Prof C S Hudson, U S Public Health Service, Prof Reid Hunt Harvard University, Dr Frederick B LaForge Bureau of Chemistry and Soils, U S Department of Agriculture Prof Torald Sollmann, Western Reserve University Dr Walter L Treadway U S Public Health Service Prof Carl Voegtlin National Institute of Health U S Public Health Service, and Prof Francis G Blake, Yale University, chairman of division of medical sciences, National Research Council

At the University of Virginia a research laboratory was established under Dr Small's direction for chemical analysis and synthesis of alkaloid substances related to or similar to morphine Because few American chemists had worked on alkaloid chemistry in the past 25 years, it was necessary at the start of the work to import chemists from Europe for Dr Small's laboratory Dr Small himself spent two years in narcotic research in Europe The "imported" chemists who have worked with him are Dr Erich Mosetting and Dr Alfred Burger

At the University of Michigan another research laboratory was established under the direction of Prof C W Edmunds and Dr Nathan B Eddy, for biological testing of the narcotics and their substitutes

All clinical work is being done under the direction of Dr Walter Treadway chief of the division of mental hygiene U S Public Health Service

Funds for the work are being provided by the Rockefeller Foundation —*Science News Letter*, December 15 1934

Dihydrodesoxymorphine D was made by Dr Lyndon F Small University of Virginia research chemist It is ten times as effective as morphine in relieving pain Given as a substitute for morphine to persons addicted to the latter drug, the new product satisfied the cravings of the addicts and relieved the painful abstinence symptoms that follow withdrawal of morphine This indicated that it also might be habit forming

---

Wishing You Health and a Successful 1935

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council" —Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads 'The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues-paid members of the Association holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

CHICAGO

The 224th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held November 20th, at the University of Illinois College of Pharmacy President G L Webster called the meeting to order and appointed the following nominating committee for officers of the Branch for the ensuing year W B Day, *Chairman*, I A Becker and William Gray

The speaker of the evening was Frank J Zuck, a pharmacist of Rockford, Illinois, whose subject was 'Pioneering in a New Field" Mr Zuck at one time taught in the Pharmacy Department of the local college and after leaving engaged in the retail drug business in Rockford, specializing in prescription work and specialties pertaining to the medical profession

Mr Zuck stated that he believed the average strictly prescription shop could not hope to prosper greatly from prescription work alone and that there were possibly three main side lines that could be used by the druggist in this specialized field to enhance the trade and profits namely (1) Surgical supplies, (2) Manufacturing for your store and others (3) A laboratory fulfilling the needs of the doctors Mr Zuck elected to choose the first mentioned and gave figures to show the huge business he carries on in this line, mentioning instruments etc, that would probably be foreign to the average druggist, he pointed out the necessity of being well versed in this particular field if success is to be expected

The speaker stressed that work must be made a passion if returns are to be expected from the investment Mr Zuck's philosophy of success in the retail drug business may be summarized as follows Be in love with the work get a good basic knowledge while in college in preparation for future work work toward a model and a goal, not to be restless and expect results to come too fast by visualizing the project fewer mistakes will be made, not to be averse to criticism, start out with a small capital He explained the last statement, which might be criticized by some in that it was an advantage against initial overspending and that more careful and exacting surveys are made of every detail large or small, if the capital is limited

Mr Zuck recommended that a prescription store be in the downtown area or near a group of physicians He also suggested that at least fifteen or twenty physicians would be needed to foster a store of this type, not all of their patronage should be expected but whatever comes should be merited and received with a smile

The remainder of the discussion dealt mainly with the manner in which the store is being conducted, the high lights of which are Direct buying from the manufacturer runs about 90% in the store The clerks must know the doctors and their needs, must read the current journals and be informed on late trends in the pharmacy and medical world New literature is kept on file for the use of the doctors

Mr Zuck's shop has all steel shelving, adjustable for any particular need The prescription department is systematized for accuracy, efficiency and cleanliness Separate desks are maintained for will call packages " deliveries, bicycle hops and post office mailing The prescription counters are white enameled to give a clean appearance and to show dirt so that they will be kept clean The prescription counter is of the glass enclosed "partial sight" type This is expected to stimulate the interest of the customer and to advertise the profession of pharmacy

A dental line has been added as an adjunct to the surgical line in the belief that there is a growing interest between the dentist and the pharmacist Wheel chairs and crutches are rented A full line of baby specialties is carried Oxygen tents and infra-red lamps are rented From a small beginning the rubber tubing business has grown to large proportions and a full line is carried

There are complete facilities for the storing of biological and perishable materials One compartment of the refrigerator is made up of individual lockers for the use of the doctors who have keys and sole access to their individual lockers

A complete line of diabetic supplies is featured as this has grown in importance

Salesmen are treated as friends as they are sources of much new and advance information

Doctors are furnished with prescription blanks but the name of the drug store is purposely omitted so as not to tie the doctor down to the store The idea is maintained that the faith and friendship of the doctor to the store is sufficient A card index of the doctors is made with much information thereon including their usual formulas and ingredients

A free scale is placed in the store for those who care to weigh themselves, or packages This has been found to bring in many customers

A close alliance is kept with the hospitals and much business is obtained from this source

At this point Mr Zuck concluded his very interesting discussion with the suggestion that for a later meeting a speaker be obtained, for the benefit of the many senior pharmacy students present, who would deal with the financing and managing of a drug store with respect to buying, business records, inventories and the many other money problems, a good knowledge of which is essential to success

LAWRENCE TEMPLETON *Secretary*

NEW YORK

The November meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on the evening of November 12, 1934, in the College of Pharmacy, Columbia University About fifty members and guests attended The meeting was opened by President Ballard The minutes of the previous meeting were read and approved Treasurer Currens reported a balance of $217 10 on hand The application of Samuel C Henry for membership in the New York Branch was presented and accepted

Chairman Kidder, of Professional Relations Committee reported that cooperation between physicians and pharmacists was progressing He called attention to a Physicians and Pharmacists' meeting held in Westchester about a month ago, and also mentioned that Dr Ballard would address physicians in the Hackensack Hospital on November 13th, on "Physician, Pharmacists and Patient "

Chairman Lehman, of the Committee on Legislation and Education, reported the following

Proposed Budget of The Code Authority for the Retail Drug Trade provides for the collection of the following sum to cover the period from November 1 1934 to April 30, 1935 Total $204,309 00, of which $25,000 00 is to be allocated for the National Code Authority and $179,309 00 to local and state authorities Means of collection is $1 00 per employee from each retail drug establishment in towns of more than 2500 inhabitants those below that number being exempt 50¢ for each establishment to go to the National Authority, the balance to state and local

Establishments liable to the assessment are such in which over 50% of the business is done in drug items This seems unjust as some of the Department stores have drug departments that do more business than some of the Chain Stores, also some retail establishments in cities of 2500 inhabitants do a larger business than many of the stores in large cities

A hearing on the question of putting soaps under the drug instead of the grocery code was held in Washington on October 23rd No decision has been made so far

Commissioner Anslinger warns retail druggists that all exempt narcotics must be recorded by the seller, whether official proprietary, prescription or otherwise

There are prospects of a bill to be introduced in Congress requiring the Federal Registra

tion of all persons who import, manufacture, produce, compound, sell, dispense or deal, in drugs or medicines The annual fee is to be $5 00 plus $1 00 for every registered person employed in the establishment This may tend to restrict the sale of medicines and drugs to registered pharmacies and drug stores

The Capper-Kelly bill may be reintroduced, in somewhat changed form, also the Tugwell bill

In reference to the prohibition of sale of Valerian, its compounds, derivatives and preparations, several pharmacists and others were arrested during the past week for having bought valerianates and valerianic acid, one was fined $25 00 for having bought 4 ounces of valerianic acid, and making use of it without being able to show a prescription or having any record as to its disposition

The strike of the Drug Clerks is still confined to the Bronx, where stores which have refused to sign up with the Union are being picketed Wage demands are not exhorbitant, from $30 00 to $35 00 a week, and the hours from 48 to 56 However, the employer who signs up is obliged to employ his clerks through the Union, cannot discharge anyone unless permitted by the Union, and must permit the Union officials to examine his books from time to time to determine whether he is in a position to increase the compensation of his employees

A "Pharmaceutical Employer-Employee Coordinating Committee" has been organized to combat this movement and isolate it as much as possible

An organization meeting of the Federation of Eastern State Pharmaceutical Associations was recently held The purpose of this organization is to advance the cause of price stabilization, provide a code of ethics for the industry, promote Retail Code enforcement, and restrict sales of drug items to drug stores It has many problems before it

Due to the absence of the Committee members, Dr Ballard read the report from the committee appointed to draw up suitable resolutions concerning Dr Kassner The report was as follows

RESOLUTIONS, DEATH OF HERBERT C KASSNER

WHEREAS, in the death of Dr Herbert C Kassner American pharmacy has sustained an irreparable loss, the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION takes this occasion to express its sorrow and grief in the following resolutions

Resolved, that we are deeply cognizant of his capabilities as an officer of this association, that by his loyal diligent and efficient performance of duty he helped materially in building up the activities of this branch, that by his kind consideration of others and his eagerness to cooperate, he was an ideal associate to work with

Resolved, that we join, with many others, in expressing our deepest regret that a career, so rich in possibilities of future contributions to our profession should have been curtailed while he was barely in the prime of life

Resolved that these expressions of our esteem and sympathy be inscribed upon the minutes of our organization, and that a copy suitably engrossed, be transmitted to the family of the late Dr Herbert C Kassner

(Signed) ABRAHAM TAUB, Resolutions Committee
SAMUEL S LIBERMAN

Following the reading, Dr Arny moved acceptance of the report, this was seconded and the report was approved

Dr Schaefer, Fischelis Dinner Chairman now reported that the dinner had been postponed to January 10th, and would be held in the Pennsylvania Hotel at four dollars ($4 00) per plate Postponement was necessary because of the recent death of Dr Fischelis' father

President Ballard then introduced the speaker of the evening, Dr William Crocker, managing director of the Boyce-Thompson Institute, who spoke on "Some Biochemical Researches at Boyce-Thompson Institute"

The speaker outlined the plan of work at the Institute pointing out that work was conducted on a project basis rather than individual research He emphasized that in his opinion there was no distinction between applied science and pure science when it came to research

In explaining some of the work conducted at the Institute, Dr Crocker discussed four subjects, namely, the effect of light upon plants, superstimulants which have been discovered that throw dormant plants into active growth, how sulphur acts as a fungicide, and the stimulative and anesthetic action of the simple unsaturated carbon gases as ethylene, acetylene and carbon monoxide upon plants

The studies on the effect of light on plants were conducted with artificial light, and with ultraviolet, and with infra red light Special glass was used in some green houses

Of exceedingly great interest were the lantern slides and the motion pictures used to illustrate the lecture The stimulating action of certain substances and the anesthetic action of others was vividly illustrated by motion pictures The films showing the growth of plants were unique

Dr Crocker was assisted by Mr Floyd

At the close of the speakers' address there was some discussion, after which a rising vote of thanks was accorded Dr Crocker and the meeting adjourned

RUDOLF O HAUCK, *Secretary*

COLONIAL LAWS PERTAINING TO PHARMACY *

BY DAVID L COWEN [1]

The medical historian seeking material descriptive of conditions in that profession in early America can find much of interest in the statute books of the thirteen colonies True enough, the uncomplimentary may exceed the complimentary but nevertheless there is an abundance of material with which to work

The situation is not so happy with regard to pharmacy a search through the records has yielded but two colonial laws specifically mentioning the apothecary Moreover but one of the two a Virginia Act of 1736, was specifically intended to regulate the apothecary, the other, a South Carolina Act of 1751, placed restrictions on the apothecary as an adjunct to the regulation of slaves [2] It would be flattering if this paucity of legislation were traceable to the fact that the apothecary did not abuse his profession as did the 'Phisitian and Chirurgeon," and therefore was not subject to uncomplimentary legislative regulation Less flattering would be the possibility that the apothecary had not attained the professional level of indispensable service to the community that was conducive of exploitation or that the profession was not sufficiently significant numerically to exert any social pressure one way or the other The most logical explanation is, of course, that the pharmaceutical and medical professions had not yet differentiated The laws regulating the "practice of physic," probably regulated also what was then the practice of pharmacy If this is not exactly so the result is obtained if we consider the apothecaries as the ' others ' in the colonial laws that regulated "Physicians, Surgeons, Midwives and others "

There is ample evidence in colonial statutes supporting the fact that the physician was his own apothecary To cite but one set of examples, Virginia in 1639, 1646, 1658, 1662 and 1692 enacted laws substantially to the effect that any "phisitian or chirurgeon," whose fee seemed exorbitant, could be brought before a court where he had to 'declare upon oath the true value worth and quantity of his drugs and medicines administred "[3]

---

* Read before Northern New Jersey Branch, A PH A

[1] Instructor in History, Rutgers University, New Jersey College of Pharmacy

[2] Authorities have previously suggested two other laws a Virginia Act of 1636 and a New Jersey Act of 1664 Neither is authentic In regards to the former, see fn 4, *infra* The reference to the New Jersey Act is found in the chronological table in C H LaWall, 'Four Thousand Years of Pharmacy" (Philadelphia, 1927), page 572 "1664 New Jersey passes earliest law regulating apothecaries in the new world " That there was no such law is evident from the fact that 1664 was the year in which New Jersey first became a political entity by virtue of the English conquest of New Netherlands, and that the "first Assembly ever convened in New Jersey met May 26–30 1668 ' [F B Lee, "New Jersey as a Colony and a State" (New York, 1903), Vol I, page 135] If the reference (Cf LaWall, page 331) is to one of the "Duke's Laws" of 1665 (which are more applicable to New York than to New Jersey), there was a law, not unique admonishing no person as 'Chirurgions, Midwives Physicians," to "presume to Exercise or put forth any Acts contrary to the known approved Rules of Art in each mistery ' ["Colonial Laws of New York" (Albany, 1894), Vol I, page 27] Absolutely no mention of apothecaries is made

[3] The years are given in new style The titles of these Acts are similar to An Act about Physicians and Chyrurgeons Accounts " The 1646, 1658, 1662 and 1692 Acts are in, W W Hening, "The Statutes at Large of Virginia" (New York, etc , 1819 etc) Vol I, pages 316, 450 Vol II, page 110, Vol III, page 103 The 1639 Act is referred to in a footnote, *Ibid*, Vol I, page 450 The quotations are from the 1646 Act

This item also serves to illustrate the reference above to "uncomplimentary" legislation Actual arrest of the physician was, until the Act of 1692, involved in the procedure, and it devolved upon the court to determine the fee he was to receive Similarly the reasons given for this legislation exemplify what was meant by professional "abuses" The preamble to the 1646 act stated that medical attention, despite its uncertain and often detrimental effects, was so much more expensive than the replacement costs of slaves and servants, that the planters found it more humane and economical to let their slaves die!

It is not the intention here to discuss the laws regulating the practice of medicine, they bear a relation to pharmacy by inference alone Only the two laws concretely mentioning the apothecary to which reference already has been made and such few other laws as have a direct bearing on pharmacy will receive consideration

Most important, both in point of time and in content, is the Virginia Act of 1736 [1] It is fitting that with the dearth of material this law should prove a veritable mine of information as to pharmacy in colonial America This wealth of information warrants its complete reproduction here

AN ACT FOR REGULATING THE FEES AND ACCOUNTS OF THE PRACTICERS IN PHYSIC

I WHEREAS the Practice of Physic, in this Colony is most commonly taken up and followed, by Surgeons, Apothecaries, or such as have only served Apprenticeships to those Trades, who often prove very unskilful in the Art of a Physician, and yet do demand excessive Fees and exact unreasonable Prices for the Medicines which they administer and do too often for the Sake of making up long and expensive Bills, load their Patients with greater Quantities thereof, than are necessary or useful, concealing all their Compositions, as well to prevent the Discovery of their Practice, as of the true Value of what they administer, which is become a Grievance dangerous and intolerable, as well to the poorer Sort of People, as others, and doth require the most effectual Remedy that the Nature of the Thing will admit

II *Be It therefore Enacted by the Lieutenant Governor Council and Burgesses, of this present General Assembly, and it is hereby Enacted by the Authority of the same,* That from and after the Passing of this Act, no Practicer in Physic in any Action or Suit whatsoever, hereafter to be commenced in any Court of Record in this Colony shall recover for Visiting any sick Person more than the Rates hereafter mentioned That is to say,

	l	*s*	*d*
Surgeons and Apothecaries, who have served an Apprenticeship to those Trades shall be allowed			
For every Visit and Prescription, in Town or within Five Miles,	00	5	00
For every Mile above Five, and under Ten	00	1	00
For a Visit of Ten Miles	00	10	00
And, for every Mile above Ten,	00	00	06
With an Allowance for all Ferriages in their Journeys			
To Surgeons For a Simple Fracture and the Cure thereof,	02	00	00
For a Compound Fracture and the Cure thereof	04	00	00

[1] Various authorities have erroneously dated this Act as 1636 See S Wickes, 'History of Medicine in New Jersey" (Newark, 1879), page 54, F H Garrison 'An Introduction to the History of Medicine" (Philadelphia, 1914), pages 233, 682, *Ibid* 1929 Ed pages 304, 824, and LaWall, pages 331 571 It is evident from the following that there was no such act in 1636

1 There is no record of it Only two acts of the 1635/6–1636/7 sessions of the Virginia Assembly have been preserved and the titles to ten others are known [see the preface to the Journals of the House of Burgesses of Virginia 1619–1658/59" (Richmond 1915) page xxxv and none of them refers to physicians surgeons or apothecaries

2 Wickes cites as his authority the "Half Yearly Compendium of Medical Science" Jan 1878 (which see, page 66) This however gives the date correctly as 1736

	l	*s*	*d*
But those Persons who have studied Physic in any University, and taken any Degree therein, shall be allowed,			
For every Visit, and Prescription, in any Town, or within Five Miles,	00	10	00
If above Five Miles for every Mile more, under Ten	00	1	00
For a Visit, if not above Ten Miles,	01	00	00
And, for every Mile above Ten,	00	01	00

With an Allowance of Ferriages, as before

III AND to the End the true Value of the Medicines administred by any Practicer in Physic, may be better known, and judged of, *Be it further Enacted by the Authority aforesaid*, That whenever any Pills, Bolus, Portion, Draught Electuary, Decoction or any Medicines, in any Form whatsoever, shall be administrred to any sick Person, the Person administring the same shall, at the same Time, deliver in his Bill, expressing every particular Thing made up therein, or if the Medicine administred be a Simple or Compound, directed in the *Dispensatories*, the true Name thereof shall be expressed in the same Bill, together with the Quantities and Prices in both Cases And in Failure thereof, such Practicer or any Apothecary making up the Prescription of another shall be nonsuited in any Action or Suit hereafter commenced, which shall be grounded upon such Bill or Bills Nor shall any Book, or Account, of any Practicer in Physic, or any Apothecary, be permitted to be given in Evidence, before a Court, unless the Articles therein contained, be charged according to the Directions of this Act

IV AND *be it further Enacted, by the Authority aforesaid*, That this Act shall continue and be in Force for and during Two Years, next after the Passing thereof, and from thence to the End of the next Session of Assembly [1]

An analysis of this Act serves to corroborate many other evidences from a multitude of sources and to alter some conceptions of certain facts in American pharmaceutical history

Of primary importance is the close interrelation between colonial pharmacy and medicine that is so clearly demonstrated The apothecary is definitely and legally stated to be a Practicer in Physic," by his inclusion in the Act Added to this is the description of services (Sec I) and the list of fees (Sec II) for services, obviously more medical than pharmaceutical in modern practice Conversely, the Act illustrates that the surgeon and even the physician who had taken any Degree," compounded their own medicines

The indictments against the surgeons and apothecaries (Sec I) are indeed as interesting a commentary on colonial pharmacy as could be desired That they practiced "Physic" although "unskilful in the Art of a Physician" is reminiscent of the famous case of William Rose in England in the previous century, and is a precursor of disaffection to come So also did the Act presage the victory of the physicians as the difference in fees enumerated in Section III will bear witness

That the surgeon and apothecary padded their bills administered huge doses and concealed the contents of their concoctions recalls not only conditions in England in the seventeenth century, but also the aspersions cast upon the physicians themselves in the Virginia laws of 1639 and after Nor can the ethical implications of these indictments be passed over Their inclusion in the Act along with the accusation of professional secrecy in order to prevent the Discovery of their Practice " formed a challenge to the profession to clean house

The final indictment of the surgeons and apothecaries was that they had learned their "Trade" only by serving apprenticeships This seems almost unduly derisive in an age when apprenticeship was the accepted mode of learning in a country offering no other means One can almost visualize the sneer of the graduate physician behind that indictment Yet we have here one of the earliest, if not the first concrete documentary evidences of pharmaceutical apprenticeship in America Nor can the inference be passed over that only such apothecaries who had served apprenticeships were eligible to practice in Virginia At least it seems that a self-constituted apothecary who had not served an apprenticeship, could not legally demand or

[1] The Act was first published as Chapter X of the Acts of 1736 in, *Anno Regni Georgii II Regis Decimo At a General Assembly continued to the fifth day of August 1736* (Williamsburg 1736) pages 26–27

recover fees equal to those apportioned by the Act to regularly apprenticed apothecaries Only the fees of graduate physicians, and surgeons and apothecaries who had "served an Apprenticeship" are enumerated

The differences between the fees granted the surgeons and apothecaries and those granted the physician with a degree (Sec II), show that the worthy Burgesses had been convinced that the ministrations of a physician were worth just twice that of the others One wonders at the efficacy of this mode of regulation The Virginia planter might be tempted greatly by the saving in calling the cheaper practitioner, especially, in the light of the Virginia legislation in the seventeenth century, if a servant or slave were the afflicted There is also the possibility that the cheaper rate for his medical advice tended to force the apothecary into a more truly specialized pharmaceutical practice, at least it is logical to attribute some such intention or hope to the instigators of the law In this respect the Act can be considered the first legal attempt to separate the pharmaceutical and medical professions, for it antedated by twenty-four years the first colonial law anent the licensing of physicians which was passed by New York in 1760 [1]

Section III of the Act was merely an improved substitute for the laws cited above, passed in Virginia during the preceding century The bill of particulars took the place of the practitioners' oaths of the earlier laws, and such particularization often became an integral part of later medical legislation throughout the country

Two other important items remain to be emphasized The mention of 'Dispensatories" constitutes one of the few references to them in colonial records of any sort, and the first legal recognition of such compilations The records reveal no other similar utilization of a dispensatory or pharmacopœia until over a century later when a federal statute of 1848 set standards of purity and strength by reference to American and European works [2] It is significant to remember that in 1736 no dispensatory or pharmacopœia had yet been published in America

The final item of importance is the reference in Section III to "any Apothecary, making up the Prescription of another " Here we have concrete proof that the apothecary was already assuming his specialized function in pharmaceutical practice as early as 1736 It demonstrates that the appointment of Jonathan Roberts as apothecary at the Pennsylvania Hospital in 1752 ' to fill prescriptions other than his own "[3] was not an entirely unprecedented procedure More important, however, is that the "introduction" of prescription writing in America can no longer be attributed to John Morgan in 1765 [4] Unquestionably Morgan deserves much credit for championing and popularizing professional differentiation in the face of potent opposition, but the credit for the actual introduction of prescription writing must, until further evidence is found devolve upon some unknown Virginia practitioner who preceded Morgan by at least thirty years

Unlike the Virginia Act the South Carolina Act of 1751, as has been intimated, was not an attempt to regulate the apothecary but to control slaves A good portion of this Act however, is of interest

> An Additional and Explanatory Act to 'An Act for the better Ordering and Governing Negroes and other Slaves in this Province [May 17 1751]
>
> VII *And Whereas* the detestable Crime of Poisoning hath of late been frequently committed by many Slaves in this Province and notwithstanding the Execution of several Criminals for that Offense yet it has not been sufficient to deter others from being guilty the same *Be it therefore Enacted* by the Authority afore-

---

[1] Although the General Court of Connecticut (*i e* the legislature) licensed physicians in the seventeenth century there seems to have been no legislation covering the matter Reputation apparently was the major criterion in granting the license

[2] ' An Act to prevent the Importation of adulterated and spurious Drugs and Medicines," *Statutes at Large and Treaties of the U S A , 1845–1851* (Boston, 1851), pages 237–239 known as Vol IX of the *Statutes at Large*

[3] M I Wilbert, ' The Beginnings of Pharmacy in America" in *American Journal of Pharmacy*, Sept , 1907, page 400

[4] J W England, Ed The First Century of the Philadelphia College of Pharmacy" (n p 1922) pages 21, 24 and LaWall, page 576

said, That not only such Negroes, Mulattoes or Mestizoes (whether free or bond) as shall administer Poison to any Person or Persons (whether free or bond), but also all and every Negro, Mulatto and Mestizo (whether free or bond) who shall furnish, procure or convey any Poison to be administered to any Slave or Slaves, to any Person or Persons as aforesaid, and also all such Negroes, Mulattoes and Mestizoes (whether free or bond) as shall be privy (and not reveal the same) to the administering of any Poison to any Person or Persons as aforesaid or be privy (and not reveal the same) to the furnishing, procuring or conveying any Poison to be administered to any Person or Persons as aforesaid, shall be deemed and adjudged, and all and everyone of them are hereby declared to be Felons, and shall suffer Death, in such Manner as the Persons appointed and impowered by the Act *for the better ordering and governing Negroes and other Slaves in this Province*, for Trial of Slaves, shall adjudge and determine

X *And be it further Enacted*, by the Authority aforesaid, That in Case any Slave shall teach or instruct another Slave, in the Knowledge of any poisonous Root, Plant, Herb or other sort of Poison whatever, he or she so offending, shall, upon Conviction thereof, suffer Death as a Felon And the Slave or Slaves so taught or instructed, shall suffer such Punishment (not extending to Life or Limb) as shall be adjudged and determined by the Justices and Freeholders, or a Majority of them, before whom such Slave or Slaves shall be tried

XI *And*, to prevent as much as may be, all Slaves from attaining the Knowledge of any mineral or vegetable Poison, *Be it further Enacted*, by the Authority aforesaid, That it shall not be lawful for any Physician, Apothecary or Druggist, at any Time hereafter, to employ any Slave or Slaves in the Shops or Places where they keep their Medicines or Drugs, under Pain of forfeiting the Sum of *Twenty Pounds* Proclamation Money for every such Offense, to be recovered and applied as is herein after directed

XII *And be it further Enacted*, by the Authority aforesaid, That no Negroes or other Slaves (commonly called Doctors) shall hereafter be suffered or permitted to administer any Medicine or pretended Medicine, to any other Slave, but at the Instance or by the Direction of some white Person And in Case any Negro or other Slave shall offend herein, he shall, upon Complaint and Proof thereof made to any Justice of the Peace for the County suffer corporal Punishment not exceeding *Fifty* Stripes [1]

The provisions of Sections VII, X and XII were not entirely new In 1748 a Virginia Slave Act contained the severe provision that if "any negro, or other slave, *shall prepare*, exhibit or administer any medicines whatsoever, [except upon order of the master] he or she shall be adjudged guilty of a felony and suffer death without benefit of clergy "[2] There was but one meager allowance if it were proved that there was neither ill intent nor bad consequences, such slave shall have benefit of clergy "[3] Later, in 1770, Georgia added provisions to its slave laws[4] closely resembling those of the South Carolina Act The Virginia Act of 1748 by prohibiting "exhibition," only inferred a restriction on the transmission of a knowledge of drugs, the Georgia Act specifically banned it in almost the exact words of Section X of the South Carolina statute

The relation of these three laws to pharmacy is evident They can be classed readily as America's first definite anti quack legislation, and formed the basis for similar enactments

---

[1] The Act was first published in *Acts Passed by the General Assembly of South Carolina continued to the 24th Day of April 1751* (Charleston 1751), pages 31–38

[2] The term "benefit of clergy" is the Anglicization of the legal term *Privilegium Clericale* and should not be given its modern literal interpretation

[3] "An Act directing the Trial of Slaves committing capital Crimes ," Hening, "Statutes at Large," Vol VI, page 105

[4] "An Act for ordering and governing slaves within this province " R Watkins and G Watkins, "Digest of the Laws of the State of Georgia" (Philadelphia, 1800), pages 163–179

in the South before the Civil War The Virginia Act of 1748 definitely emphasized the preparation and exhibition of any medicine whatsoever," and not merely the administration of poison as did the other two The latter however, were specific in prohibiting the transmission of a knowledge of drugs by slaves All three, although such was not their purpose, present the earliest legal ban on unscientific and mystic accumulation of drug information The lore of the African medicine man, in law at least, was no longer to be practiced or transmitted in those three colonies Moreover, the actual presence of this lore in colonial America forms itself a most intriguing branch of early American pharmaceutical history The history of American pharmacy begins, not with the migration of some European physician or apothecary to the New World, but with the magical manipulation of herbs by the Amerind later to be augmented, and largely supplanted (in the South) by the lore of the African medicine man There may be some objection to terming such legerdermain as pharmacy, but as the eminent anthropologist, Sir James G Frazer, has said, The fallacy of differentiation a science or an art according to its application and the moral intention of the agent is obvious enough with regard to pharmacy "[1]

The provisions of Section XI of the South Carolina Act are not found in either the Virginia Act of 1748 or the Georgia Act of 1770 Part of the interest in this section lies in the mere mention of 'Apothecary or Druggist" As already stated this is the second and last mention of the apothecary in colonial law Not until 1786 does 'apothecary" appear again in the laws, and then only incidentally when Virginia imposed a tax on 'every practising physician apothecary-or surgeon "[2] As a matter of fact, none of the terms apothecary" pharmacist," or 'druggist" appears with any regularity in the state rolls until well into the nineteenth century, and the law digests do not give the profession the dignity of an individual title consistently, until the wave of regulation that commenced in the 1870's

The use of the term Druggist" in Section XI of the South Carolina Act is of course unique, for it did not appear in the Virginia Act of 1736 At first glance it would appear that 'Apothecary" and 'Druggist" were being used interchangeably, for there is no comma after the former in the phrase Physician Apothecary or Druggist" However, an examination of parallel phrases, *e g*, Negroes Mulatoes or Mestizoes" in Section VII, reveals a similar dropping of the comma The most logical conclusion is therefore that a differentiation between the two terms was being made, especially since such a differentiation is definitely known to have been the practice in colonial America

The final distinctive feature of Section XI is the prohibition of the employment of a slave by apothecaries in their "Shops" The Virginia Act of 1736 did not specifically mention the shop, and the only restriction on his running of a shop was that the apothecary particularize his bill These two isolated restrictions were the only requirements placed upon the colonial apothecary but they form the beginnings of what in the parlance of today might be termed loosely, the 'regimentation" of the pharmacist

There remains one other type of law bearing a direct relation to pharmacy In 1773 Connecticut met the evil of itinerant medicine shows with a law prohibiting the sale of "any Physick, Drugs, or Medicines" by any Mountebank" and all shows or exhibitions by them The Act was passed not only because "the Practice of Mountebanks, in dealing out and administering Physick and Medicine of unknown composition has a practice to destroy the Health Constitution, and Lives of those who receive such Medicines," but also because amusingly enough 'Plays, Tricks, Jugling or unprofitable Feats of uncommon Dexterity and Agility of Body," which was part of the Mountebanks' stock in trade, had a tendency toward "Corruption of Manners promoting of Idleness, and the detriment of good Order and Religion "[3] New Jersey had included a similar although less virulent, provision in its act regulating the practice of medi-

---

[1] In his preface to, B Malinowski "Argonauts of the Western Pacific" (London, 1922), page xiii

[2] An Act imposing new Taxes," Hening, "Statutes at Large," Vol XII pages 283–287 This was repealed in 1790 'An Act to Repeal Part of an Act imposing new Taxes" *Ibid*, Vol XIII, pages 114–115

[3] An Act for suppressing of Mountebanks," 'Acts and Laws of the State of Connecticut" (New London, 1784), pages 161–162

cine a year before,[1] and again enacted it in 1783.[2] Similar laws occasionally make their appearance in the nineteenth century

It must be pointed out in closing that the foregoing pertains only to the thirteen English colonies in America that later became the original United States No general statements have been made that were intended to include Spanish, French or other English colonies in America The writer feels that a search through the legal records of these three groups of colonies will uncover material of interest to pharmaceutical history It is not amiss to mention that the start of such a search has already revealed one item of interest On February 12 1770, the Spanish Governor of Louisiana, Don Alexandre O Reilly issued an edict intended to regulate the practice of surgery, which, printed in French as a broadside, included the following comment on medicine, surgery and pharmacy

> Medicine embraces three parts, namely medicine proper, which is the science of recognizing diseases, and the relation which they have with remedies and of prescribing the latter together with the diet The other two parts, which are surgery and pharmacy, are its attendants and have their special field Surgery includes the use in general of the hands and of external remedies Pharmacy is concerned, generally speaking, with the preparation of remedies [3]

Thus, by gubernatorial edict, the distinct and separate existence of pharmacy as a branch of medicine received legal recognition in clear and concise form The pharmaceutical profession had indeed made great progress when Don O Reilly was able to proclaim, "la Chirurgie, & la Pharmacie ont leur district particuleur"

STUDENT BRANCH OF ST JOHN'S UNIVERSITY, COLLEGE OF PHARMACY

December 7th, Dr Victor G Fourman, Chief Chemist of Compagnie Parento Importers of Essential Oils and Synthetics Croton on the-Hudson, New York, delivered a lecture on Flower Oils and Perfumes to the Members of the Group at the regular meeting of the Student Branch, A Ph A, St John's University College of Pharmacy

"The story of perfumes starts with the dawn of history" the lecturer pointed out It was noted that natural products of plant and animal origin were used exclusively until the chemist Tiemann prepared vanillin by a synthetic process in 1874 This was the first perfume chemical to be prepared by a synthetic process and marks the beginning of modern perfume chemistry It is to be noted in this connection that, while synthetic perfume materials are now largely employed, many of the natural products used by the ancients are still in use

While essential oils can be obtained from practically any flower it is interesting to note the fact that the number of flower oils on the market can be counted on the fingers of both hands Dr Fourman pointed out as the reason for this the high cost necessary to produce the flower oil Natural oil of gardenia, a product most often prepared synthetically, would cost about $1000 00 per pound to produce from the flower

After describing the various methods used to extract oils from flowers, the lecturer pointed out some interesting facts in connection with the oils so prepared Very often the oil extracted from the flower possesses an odor different from the flower itself In the case of otto of rose it was pointed out that some of the phenyl ethyl alcohol contained in the oil is removed by the water during the distillation with steam This small amount of phenyl ethyl alcohol is responsible for the difference in odor and when it is replaced the odor again resembles that of the flower

The lecturer in dealing with synthetic perfumes pointed out that the artificial product prepared from the approximate constituents of the true flower oil is at first harsh and disagreeable

---

[1] 'An Act to regulate the practice of physick and surgery ," S Allinson, "Acts of the General Assembly of the Province of New Jersey" (Burlington 1776), pages 376–377

[2] "An Act to regulate the practice of physic and surgery " W Paterson, "Laws of the State of New Jersey" (Newark 1800), pages 51–52

[3] A translation of the complete broadside is available See D C McMurtie, "A Louisiana Decree of 1770" in *New Orleans Medical and Surgical Journal*, Vol LXXXVI, No 1, July 1933 pages 7–11

miles away from the natural odor It is here that the expert perfumer adds the subtle something that tones down, sweetens and brings the synthetic to the standard of the natural oil In this connection, Dr Fourman stated that perfume chemistry is largely empirical

During the lecture Dr Fourman exhibited the samples of perfume materials recently presented to the College by his firm Among the samples shown were a natural musk pod and phials of civet and civetine

In the discussion that followed, it was pointed out in regard to the kind and quality of alcohol used in perfumery that there was essentially little difference between wine or grain spirits and that an expert might produce an attractive perfume using ordinary "rubbing alcohol" In connection with the perfuming of cosmetics it was pointed out that it is quite important to realize that a perfume that is suitable for a soap might not be useful at all for a face powder

At the conclusion of the lecture and discussion a vote of thanks was extended Dr Fourman

---

SCIENCE WRITERS FORM ASSOCIATION

"Announcement was made September 14th of the formation of the National Association of Science Writers, made up of staff members of newspapers and press associations who devote their major efforts to the field of science Mr David Dietz, Cleveland, science editor for the Scripps Howard newspapers is president of the association, the purpose of which is to 'foster the dissemination of accurate scientific knowledge by the press of the nation in coöperation with scientific organizations and individual scientists'

The history of medicine is punctuated with accusations which have been brought against physicians and dealers in drugs from time to time A little reflection soon satisfies one that it would be very strange if this were not the case Disease and health are such intimate concerns of every human being, the treatment of sickness is and always has been, so largely the outcome of trial and error, and the beliefs of the patient and doctor are so diverse that it is inevitable that great and virulent disagreements should arise"

INSTITUTE OF PHARMACY UNIVERSITY OF LIEGE

The fiftieth anniversary of the foundation of the Institute of Pharmacy of the University of Liege was held at Liege from November 16th to November 19th under the chairmanship of Professor F Schoofs of the University France was represented by Professors Herissey, Perrot and Goris, and M Collard, Switzerland by Col Thomann Denmark by Dr Faurholt, Norway by Prof Jamstadt, Sweden by Prof Ohlson, Great Britain by Secretary H N Linstead, and the four universities of Holland by their four professors of pharmacy—van Itallie of Leiden, van der Wielen of Amsterdam, van Os of Groningen and de Graff of Utrecht Among others present were Dr J J Hofman of The Hague, president of the International Pharmaceutical Federation, Prof Polonovski of Lille and Prof Castille of Louvain

In his opening address Prof Schoofs traced the history of the growth of the Institute At the conclusion of his address he was presented by the Danish Pharmaceutical Society with a gift of books and by the Swedish School of Pharmacy with a congratulatory address

Part of the sessions were devoted to the reading of scientific papers, those attracting particular attention were papers by Prof Herissey on 'The use of diastase in the chemical in the laboratory," by Prof van Itallie on 'Norman Arsenic," and by Prof Fourneau of Paris on 'The Antagonists of Adrenalin" Mr Linstead read a paper on the method of pharmaceutical education in Great Britain The paper dealt in particular with the emphasis now placed upon the need for the pharmacist to familiarize himself with biological methods and standards In the discussion which followed Prof Perrot Mr Breugelmann, Prof Castille and Col Thomann took part M Breugelmann outlined the scheme which had been considered by some members of the Nationale Pharmaceutique for establishing an institute for biological testing in Belgium

An exhibit included old pharmacopœias and pharmaceutical documents from the collection of Dr O van Schoor of Antwerp, and an exhibition of pharmaceutical apparatus and materials by manufacturers

ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1934–1935

Office of the Secretary, 2215 Constitution Ave , Washington, D C

LETTER NO 7

November 9, 1934

To the Members of the Council

37 Joint Meeting Executive Committee N A R D and Council, A Ph A Motion No 5 (Council Letter No 6, page 1150) has been carried and the appointment of Messrs Kelly, Fischelis and Swain is approved

38 Committee on Maintenance Motion No 6 (Council Letter No 6, page 1150) has been carried and Messrs Kelly, Holton and Dunning are authorized to reduce or pay in full the note held by the Maryland Trust Company

39 Local Secretary for 1934–1935 Motion No 7 (Council Letter No 6, page 1150) has been carried and A O Mickelsen is declared elected

40 Use of Text of the N F V Motion No 8 (Council Letter No 6, page 1150) has been carried and the School of Medicine of Duke University is being advised

41 Election of Members Motion No 9 (Council Letter No 6 page 1151) has been carried and applicants for membership numbered 42 to 76, inclusive, are declared elected

42 Appropriation from the Centennial Fund The terms under which this fund was established, provided that the interest accruing from the investment of the fund is to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy No appropriation has been made from this fund for several years

The U S P-N F Prescription Ingredient Survey completed sometime ago and issued in book form has proved to be useful not only in U S P and N F revision but also in many other ways, and while the demand for the report has been encouraging it has not covered the cost of the survey above the appropriations made by the U S P Board of Trustees and the A Ph A Council

At the recent meeting of the Executive Committee, the matter was informally discussed and the Secretary was requested to submit a recommendation After discussion with Chairman Philip of the Committee on Appropriations, the following motion is submitted

(Motion No 10) It is moved by Philip that $3500 00 of the accrued interest of the Centennial Fund be transferred to the Current Fund as an appropriation toward the expenses of the U S P N F Prescription Ingredient Survey

43 Appropriation toward the Expenses of the Pharmacy Exhibit at the Century of Progress At the recent meeting of the Executive Committee of the Council, the question of an appropriation for this purpose was informally considered and the Secretary was requested to submit a recommendation at the proper time

Recently, Chairman Christensen of the Committee on Pharmacy Exhibit has advised that about $500 00 will be required above the appropriations so far secured to balance the moderate budget for the expenses for 1934 including the dismantling of the exhibit etc Chairman Christensen and his associates believe that no additional subscriptions are possible at this time and that the results of the exhibit from every viewpoint fully justify the moderate expenses incurred

After discussing the situation with Chairman Philip of the Committee on Appropriations the following motion is submitted

(Motion No 11) It is moved by Philip that an appropriation of $500 00 be added to the Budget for 1934 for the expenses of the Committee on Pharmacy Exhibit at the Century of Progress

LETTER NO 8

November 9, 1934

To the Members of the Council

44 Retail Price of the National Formulary, Sixth Edition and of the Recipe Book Second Edition The following communication has been received from Chairman DuMez of the Committee on Publications

"The time has arrived when it becomes necessary to secure estimates on the distribution and sale of the N F VI and of the Recipe Book II It is, therefore, necessary for the Council to set the retail price for both publications

"The Board of Trustees of the U S P Convention, so we are advised, have decided to increase the retail price of the U S P XI, in buckram, to $5 00 per copy, retaining the present retail price of $7 00 for the inter leaved leather-bound copy The principal reason for the advance in price of the buckram-bound copy was the increase in cost of the work of revision, including research It was the opinion of the Board that the retail selling price of the N F VI should also be increased to $5 00, in buckram, and that the present price of $7 00 in inter leaved leather-bound copy be retained, in order that the increased cost of revision of the N F , including research, should be covered

"The present retail price of the R B I, in buckram is $5 00 and there is no demand for an inter-leaved leather-bound copy

"The question of the retail selling prices for these publications has been considered by the Committee on Publications and we recommend to the Council that they be fixed as follows

National Formulary VI, $5 00 per copy in buckram
National Formulary VI, $7 00 per copy in leather
Recipe Book, II, $5 00 per copy in buckram

with the request that action be taken as promptly as possible "

(*Motion No 12*) *It is moved by DuMez that the retail selling price of the National Formulary, Sixth Edition, be set at $5 00 per copy in buckram and at $7 00 per copy in leather, and that the retail selling price of the Pharmaceutical Recipe Book, Second Edition, be set at $5 00 per copy in buckram* With the consent of the Chairman of the Council, a vote on the motion is called for at this time If there is objection or if any member wishes to submit comments or requests further information, the vote will be considered as tentative

45 *Invitations for Bids for the Distribution and Sale, Specifications for the Distribution and Sale, and Proposals for the Distribution and Sale of the National Formulary, Sixth Edition, and of the Recipe Book, Second Edition* The following communication has been received from Chairman DuMez of the Committee on Publications

The Board of Trustees of the U S P Convention have decided so we are advised to issue at an early date invitations for bids for the distribution and sale of the U S P XI, to use the same forms with certain modifications, as were employed for the U S P X, and to send the invitations to the same firms to which they were sent for the U S P X with the addition of one or two firms that have requested the privilege of submitting a bid With the invitations will be included specifications for bids and the form on which the proposal is to be submitted The forms used for N F V and for R B I are practically identical with those used for U S P X

It was also decided by the Board of Trustees, after a careful study of these forms (1) in order to avoid added responsibility, to use the word 'distributor' for 'agent,' 'sub distributor' for 'sub agent' and 'distribution' for 'agency' wherever these words occurred in either the invitation, specifications or proposal, and to add in the note in the specifications in which the term 'distributor' is defined the following words 'and is not intended to be synonymous with the term 'agent,'' following the word 'cooperation' in the second line, (2) that the word 'exclusively' be inserted in the proposal, following the words 'postal cards' and following the word 'advertise,' (3) that the minimum return in the case of buckram shall be $3 34 and of the leather-bound $4 67 It was also agreed that it would be to the advantage of the U S P as well as of the N F , to issue invitations at the same time and to the same firms It will be recalled that invitations for the manufacture of the U S P XI and N F VI were issued at the same time and that the contracts were awarded to the same firm

'The Committee on Publications have approved the issuance of bids for the distribution and sale of the N F VI and of the R B II, and have approved the changes as suggested by the Board of Trustees in the forms for the invitation

the specifications, and the proposal, and recommend to the Council that the bids be issued at the same time and to the same firms as the invitations for the distribution and sale of the U S P XI, and that the changes as authorized above be made in the invitation, the specifications and the proposal "

Copies of the invitation, the specifications and the proposal are attached to letters to members of the Council

(*Motion No 13*) *It is moved by DuMez that invitations for the distribution and sale of the National Formulary, Sixth Edition, and of the Pharmaceutical Recipe Book, Second Edition, be issued as recommended by the Committee on Publications and that the invitation, specifications and proposal be approved as submitted herewith*

46 Contract for the Printing, Binding and Distribution of the Year Book Volume 22 The following communication has been received from Chairman DuMez of the Committee on Publications

' The Committee on Publications has secured bids on the printing, binding and distribution of the YEAR BOOK, Volume 22, and recommends to the Council that the contract be awarded to the Lord Baltimore Press Baltimore, Maryland, which firm submitted the lowest bid Their bid is approximately 8 per cent higher than their bid for Volumes 20 and 21 which they have recently completed

"It is requested that action be taken on this recommendation as promptly as possible "

(*Motion No 14*) *It is moved by DuMez, that the contract for printing, binding and distributing the Year Book, Volume 22, be awarded to the Lord Baltimore Press, Baltimore, Maryland, on the basis of their bid*

47 Use of Text of the N F V The following communication has been received from Chairman DuMez of the Committee on Publications

In response to your communication of November 2nd regarding the granting of permission to the J B Lippincott Company to use the text of the N F in a book entitled 'Prescription Writing and Formulary," by Dr Charles Solomon, it is stated that I can see no reason why permission should not be granted

' In the communication which you received from the J B Lippincott, it is stated that only the name of the drug or preparation will be used I, therefore, recommend to the Council that, since the only use which will be made of the N F in the preparation of Dr Charles Solomon s book on 'Prescription Writing and Formulary' is the titles of the drugs and preparations permission be granted to the J B Lippincott Company to use the text of the N F as requested, and that no fee be charged for this privilege if it can be considered a privilege "

(*Motion No 15*) *It is moved by DuMez that permission be granted to the J B Lippincott Company to use the text of the N F V for partial reproduction in "Prescription Writing and Formulary," by Dr Charles Solomon under the usual conditions and that no charge be made therefor in this instance*

E F KELLY, *Secretary*

CHANDLER MUSEUM EXHIBITS

Chemical apparatus used by Louis Pasteur and Joseph Priestley constitute one of the most valuable historical exhibits of the Chandler Museum Movie films made by Thomas Edison in 1889 are also on view

Synthetic dyestuffs prepared from deadly war gases are shown in a special section of the museum

The museum was started in 1865 by Prof Charles F Chandler [1] pioneer in industrial chemistry and one of the founders of the American Chemical Society

[1] Deceased August 25 1925, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1867–1925

REGULATIONS FOR CODE AUTHORITIES RELATIVE TO FUNDS AND ACCOUNTING

'Pursuant to the authority vested in it by Executive Order Number 6859, and otherwise, the National Industrial Recovery Board does hereby prescribe the following regulations applicable to all Code Authorities with respect to funds and accounting

"A Each Code Authority shall promptly provide for

The designation of a person or persons who shall receive and account for all funds The furnishing of adequate security by such person or persons for the protection of funds in his or their custody The maintenance of Code Authority funds in its name and separate from all other funds The keeping of accurate and adequate accounting records, available at any reasonable time for inspection by accredited representatives of the National Recovery Administration The submission of periodic reports to the National Recovery Administration at such times as it may require An audit at the expiration of each budget period by a competent independent auditor as defined in Paragraph C hereof, such audit to be acceptable to the National Recovery Administration The publication or distribution, not later than sixty days after the budget closing date, to those members of the trade or industry who have paid assessments or otherwise contributed funds to the Code Authority of a report of its financial operations for the budget period, its financial position at the closing date thereof and of its activities in the said period, and the filing of a copy thereof with the National Recovery Administration

"B Each Code Authority shall furnish such information regarding its observance of the provisions of this Order as the National Recovery Administration may deem necessary to insure compliance therewith, and any action by a Code Authority hereunder if found by the National Recovery Administration not to be in accord with this Order, is subject to its disapproval

'C As used in Paragraph A, 6, hereof the term 'competent, independent auditor' means a public accountant in good standing who is either a certified public accountant or who has the equivalent in ability of a certified public accountant provided however that as to any service to be performed in any particular state or governmental division of the United States, such accountant in any event shall have the qualifications required by law in such state or governmental division of the United States for the performance of such service, this term further means an accountant who is in fact independent of the Code Authority whose accounts he audits Unless the National Recovery Administration permits otherwise, it will not recognize a public accountant as independent with respect to any Code Authority if (*a*) such public accountant his firm or anyone in his employ has any interest as an officer, agent or employee of such Code Authority, or (*b*) such public accountant, his firm or anyone in his employ is an officer or employee of any member of the trade or industry under such Code Authority or of any trade association of such trade or industry

---

The Robert J Ruth Memorial Trophy Chairman Anton Hogstad Jr, Pharmacy Week Committee, at right

EDITORIAL NOTES

TOLERANCES FOR AMPULS AND TABLETS

At a meeting of the Combined Contact Committee of the American Pharmaceutical Manufacturers' Association, new monographs were prepared for submission to the Food and Drug Administration on the following products Ampuls of Mercury Succinimide Tablets Methenamine and Sodium Biphosphate, and Tablets Calcium Carbonate Standards and methods were adopted for Ampuls of Bidistilled Water for recommendation to the National Formulary Committee of Revision A committee was appointed to make a study of methods for assay for Tablets of Nitroglycerin other than hypodermic tablets as it has been found that the Contact Committee methods for the assay of hypodermic tablets of Nitroglycerin do not give concordant results when applied to compressed tablets

HISTORY AND DEVELOPMENT OF PHARMACEUTICAL EDUCATION

Prof Ernst T Stuhr, of Corvallis Oregon, has addressed a letter to schools and colleges of pharmacy, as follows

'The writer is desirous of securing authentic information pertaining to the history and development of pharmaceutical education in your state The material obtained will eventually be formulated into a history of the American Colleges and Schools of Pharmacy At your earliest convenience, will you kindly supply the following data "

MATERIAL DESIRED

"1 Origin and organization of your Pharmacy Schools or College and its affiliations

"2 Organizers (Also original faculty if possible)

"3 Other institutions in your state offering a course in pharmacy and their respective locations "

GIFT BY LLOYD LIBRARY AND MUSEUM TO CORNELL UNIVERSITY

Large woodlands near Ithaca covering approximately 620 acres have been given to Cornell University by Lloyd Library and Museum of Cincinnati Ohio, for the exclusive use of biologists as a natural out of door laboratory The Lloyd Library was founded by John Uri Lloyd, senior past president of the AMERICAN PHARMACEUTICAL ASSOCIATION, and the late Curtis Gates Lloyd noted mycologist The latter died November 11, 1926, and the wood lands are a memorial to him He stipulated that when the deeds of the property were turned over to Cornell no trees or undergrowth were to be cut The woods are to be allowed to follow their natural course of growth, death and decay They have for years been protected property and now form primeval wild wood

GIFT OF CARL WEEKS TO DRAKE UNIVERSITY

Carl Weeks, Des Moines Ia , recently presented his million dollar mansion, Salisbury House, to Drake University, to be used as a college of fine arts The home of Mr and Mrs Weeks is modeled after Kings House, a Tudor mansion of Salisbury, England The building of the estate was completed only six years ago and consists of 24 rooms, 10 acres of land and valuable stone and art work Mr and Mrs Weeks will continue to live in their home until plans for endowment of the gift have been worked out Mr Weeks is serving as a member on a committee which has been formed to direct a campaign for endowment of the property

PERSONAL AND NEWS ITEMS

Dr Oliver Kamm delivered two impressive and instructive addresses November 23rd before the Science Club of the University of Georgia During the afternoon, prior to his appearance before the Science Club Dr Kamm spoke informally to the members of the faculty and to students on the campus on ' The Status of Endocrine Research " In the first of his addresses Dr Kamm spoke on 'The Place of the Chemist in Public Health, and the Part the Chemist Has Played in Public Health in the Past " The second phase of his discussion was devoted to Water Metabolism ' Dr Alfred Scott, head of the chemistry divisions at the University of Georgia presided

The Chandler Medal of Chemistry, presented annually by Columbia University for conspicous work in the field of chemistry, was awarded December 12th to Dr Jacob Goodale Lipman, dean of agriculture in Rutgers Uni-

versity and director of the New Jersey Agricultural Experiment Station

Professors Charles W Bauer and Victor E Levine completed their summer's research in Alaska, visiting many points Their expedition is one of the first in the field to gather medical statistics relating to the Alaskan Eskimo, it was a preliminary undertaking for the purpose of preparing for future medical investigations among the Eskimos

According to the *Oil, Paint and Drug Reporter*, the Department of Agriculture will continue to work for passage of legislation to strengthen the food and drugs act, Secretary Henry A Wallace declared in his annual report, released December 12th

Without saying so explicitly, the Secretary of Agriculture implied that the department will be satisfied with the form of the bill as modified by Senator Royal S Copeland rather than the original draft submitted by Undersecretary Rexford G Tugwell

At a special meeting, December 5th, of the students, faculty, trustees and friends of the Philadelphia College of Pharmacy and Science in the College auditorium an oil portrait of Dr Charles H LaWall was presented by Leon A Spielman, the artist who is a pharmacy graduate of the Philadelphia College and associated with his brother, Maurice Spielman, in the operation of two drug stores in central Philadelphia

At the presentation, Mr Spielman delivered an address entitled ' Mixing Drugs and Paints," in which he recited many interesting and humorous incidents in the development of both his professional and artistic careers

Ambrose Hunsberger, of Philadelphia, has resigned as assistant supervisor in charge of the Permissive Division, U S Bureau of Industrial Alcohol

Frederick Rohnert, Detroit, Michigan, recently celebrated a dual occasion, his 73rd birthday anniversary and his 53rd year in the drug business, in the same location He opened his pharmacy in 1881 The neighborhood has changed very much but the pharmacy has not The globes in his window are the ones he had when his business was established

Prof R W Morrison, who during the 1932–1933 term was associate professor of pharmacy at the University of South Carolina School of Pharmacy here has returned to the university as adjunct professor Upon his graduation from the university in 1929 he obtained an instructorship in the School of Pharmacy of the University of Tennessee, and there received his degree of master of science in pharmacy in 1931 He returned to that institution the following year and spent the 1931–1932 term doing work leading to the degree of Ph D During 1933–1934, he was associated with the William A Webster Company, pharmaceutical manufacturers, in its research laboratories in Memphis

Herbert M Bingham has been named Washington representative of the National Wholesale Druggists' Association He will represent the association and its members in a legal capacity before committees of Congress and before the various departments of the Federal government, and will give counsel on governmental matters which affect the industry

The Reserve Pharmacon of November displayed a view of The American Institute of Pharmacy on the cover page Among the articles of the issue is "Advertising Professional Pharmacy in Cleveland," by Gene W Johnston

Dr F J Bacon spoke on "Chemistry of Plants ' before Cleveland Section of the American Chemical Society In the illustrated lecture by Dr Bacon, he traced the history of the isolation and identification of some of the major types of plant constituents Some fifty individual plants were discussed all of which are being cultivated in the medicinal plant garden of Western Reserve University

President Harvey A Henry was a guest of honor at a banquet of the Southern California Retail Druggists' Association held in Los Angeles on December 13th

New Jersey Journal of Pharmacy for November carries the proceedings of the 64th annual convention of New Jersey Pharmaceutical Association, the constitution and by laws of the organization and the state pharmacy laws

Dr Erich von Gebauer-Fuelnegg, associate professor at Northwestern University and consulting research chemist, died November 18th at Passavant Hospital, Chicago He was thirty two years old Death resulted from inhaling hydrogen chloride in connection with the perfection of a discovery he had made in organic chemistry He was associated with the Marbro Products Company, Gary Ind , and had developed a rubber fabric said to be as transparent as window glass impervious to water and to decomposition Dr Gebauer Fuelnegg was born in Prague, Czechoslovakia Surviving are his wife and an infant daughter

OBITUARY

EDWARD S DAWSON

Edward S Dawson, long recognized as one of the leading pharmacists of New York State, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1876, died November 30th, at his home in Syracuse He was 82 years old and a native of Syracuse

For many years Mr Dawson was a member of the firm of Brown & Dawson, pharmacists, before joining the Mutual Pharmacal Company, Inc of Syracuse about eight years ago He served three terms as a member of the New York State Board of Pharmacy first appointed in 1884 by Governor Grover Cleveland He was secretary of the board for a time In *1902 Mr Dawson was elected secretary of the* New York State Pharmaceutical Association, an office he held for more than thirty years He was named honorary secretary last year

Tokens of appreciation of his work as a pharmacist were given him June 27 1933 when he and Mrs Dawson, who survives, celebrated their 50th wedding anniversary Mr Dawson was born in Syracuse September 29, 1852 He entered the drug business in 1868, in 1871 he matriculated at the Philadelphia College of Pharmacy, graduating in 1874 On his graduation he joined the firm of Brown and Elder in Syracuse purchasing in 1877 an interest in the business

Surviving are his widow, two daughters, Mrs Louis W Winchell of Cortland and Mrs Warren L Ives of White Plains a son, Edward S Dawson Jr of Schenectady

ROY C REESE

Roy C Reese member of the AMERICAN PHARMACEUTICAL ASSOCIATION, secretary of the Kansas Pharmaceutical Association and a drug inspector for the State Board of Pharmacy, died November 27th aged 52 years while on official business in Wichita

Mr Reese had been secretary of the Kansas Association for about seven years, and one of his first actions upon becoming secretary was to institute a vigorous membership drive which brought the ASSOCIATION'S strength to 85 per cent of the state's druggists

He operated drug stores in Lawrence, Kansas and Kansas City, Missouri He was secretary of the Associated Retailers of Kansas and a member of the N A R D Mr Reese made his home in Topeka, where services were held

CHARLES I CLOUGH

Charles I Clough, 67, of Tillamook one of Oregon's best loved pharmacists, passed away in Portland on November 17th following an operation for cancer from which he had been suffering for several months He was a member of the board of directors of the Oregon State Pharmaceutical Association and had been in business in Tillamook for more than a quarter of a century Prior to going there he had worked in several Portland stores, notably the old Skidmore and Pfunder pharmacies He practiced in Oregon before the State pharmacy law was passed and was Secretary of the Oregon State Pharmaceutical Association His *wife and a son and daughter survive him*

P J GARVIN

The druggists of Connecticut mourned on November 29th the sudden death of P J Garvin, well known authority on pharmacy law, inspector of pharmacies in the state, and lecturer on Pharmaceutical Jurisprudence at the Connecticut College of Pharmacy whose death was caused by cerebral hemorrhage Thanksgiving evening Apparently in good health, his death was an unexpected blow to his daughter and his many friends and associates

Mr Garvin was born in Mitchelstown, County Cork, Ireland, November 29, 1868 and was educated in the Christian Brothers Monastery there Upon his arrival in America he became interested in pharmacy, and was the proprietor of the Garvin Pharmacy in Bethel Connecticut until he became Inspector in 1918 For twenty three years he had served the pharmacists in the capacity of secretary treasurer, preceding this office by being president of the organization soon after he joined it When the need of a college of pharmacy became apparent, Mr Garvin wrote the charter for the institution, and arranged for the passage of the legislative measures for it Since its inception he had been a member of the Board of Trustees, and was given an honorary Doctor of Pharmacy degree at its first commencement He was a member of the AMERICAN PHARMACEUTICAL ASSOCIATION and constantly active in all phases of pharmacy

At his funeral services conducted at St Mary's Roman Catholic Church and according to the Dominican Rite, his casket, borne by six close friends members of the New Haven

Retail Druggists' Association, William Coughlan, president of the C P A Thomas Nugent, president of the N H D A, Arthur Rivard, Tracey Cadwell H C Sauerbrunn and Prescott Williams, passed through a long aisle formed by the guard of honor representing pharmacists from every city in Connecticut Representatives of the Danbury Lodge B P O E, Middletown Knights of Columbus, Bethel Foresters, besides members of the faculty, alumni association and student body of the Connecticut College of Pharmacy were present Hundreds of floral tributes proved the love he had inspired in the hearts of his friends and associates, and telegrams and messages of condolence were received by his only daughter Alice-Esther Garvin, from all parts of the country

The deceased is survived by his daughter Alice Esther Garvin, Lecturer in English at the Connecticut College of Pharmacy teacher of English at the New Haven High School, and editor of the Intercollegiate Catholic Club Bulletin, and three sisters, Mrs Hugh F Roper, Mrs John Lally and Miss Ella A Garvin, all of Hartford

Dr Garvin's body was placed in the Garvin plot in St Lawrence's Cemetery beside that of his wife, Alice Foley Garvin, who died on the same date five years ago

Dr Theobald Smith, president of the Rockefeller Institute of Medical Research, who turned into new channels an entire stream of medical thought died December 10th, aged 75 years An eminent pathologist, honored in almost every nation, he proved for the first time that insects hosts spread certain diseases to man and thereby pointed to ways of conquering the infectious diseases His studies blazed the way for the explanation of what then were the mysteries of malaria yellow fever and African sleeping sickness

Next to the discovery of the means of transmission of Texas cattle fever, his best known research was the differentiation of bovine from human tubercle bacilli, in 1896 Previously the differing types of disease caused by these organisms had not been recognized

The significance of Dr Smith's discovery promptly was realized by Koch, original discoverer of the tubercle bacillus, and it has played a far-reaching part in present day control of tuberculosis

In 1894 he discovered what was probably the first example of experimental disease due to vitamin deficiency His early discoveries were of use in the control of diphtheria

He was a director of the Carnegie Institution, a scientific director of the Rockefeller Institute for Medical Research from its beginning, later becoming vice president and last year on the death of Dr William H Welch, succeeded to the presidency

SOCIETIES AND COLLEGES

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The American Association for the Advancement of Science will hold its meeting December 27th to December 31st in Pittsburgh The AMERICAN PHARMACEUTICAL ASSOCIATION is represented in this organization

NATIONAL DRUG TRADE CONFERENCE *

Active, constructive participation in the movement for revision of the Federal Food and Drugs Act in the coming session of Congress was voted by the National Drug Trade Conference in its annual meeting December 5th The conference did not adopt or approve any new food and drugs bill, nor did it express its views with respect to the scope of the revision, or to the nature of additions or other changes which, in its belief should be made

The method by which the food and drugs act should be revised was not definitely stated by the conference The incoming special committee on food and drug legislation was instructed to give careful consideration to the three methods recommended to the conference by this year's committee These are (1) revision of the present act, (2) revision of S 2800 of the preceding congress to meet the views of the drug industry, (3) preparation and introduction of a wholly new bill The new committee will be composed of one representative of each of the nine constituted associations to be named promptly by these organizations

The conference referred to special committees for study a number of resolutions proposing endorsement of (1) legislation restricting

* From *Oil Paint and Drug Reporter*

the sale of drugs and medicines to establishments under the supervision of registered pharmacists, (2) requiring all manufacturers of products to be licensed annually, (3) the establishment of an agency to prepare public information on the proper use of appropriate simple remedies in self medication, (4) publication on the label of all drug products of a statement of the name and quantity of their ingredients (5) development and application of more accurate information directed to the development of the service rendered to the public by pharmacy

Cooperation with the medical, dental, nursing and other public health professions for the development of better service was voted by the conference

The officers elected are *President* Carson P Fraley, Washington, executive vice president of the American Drug Manufacturers Association, Washington, *Vice-President* A C Taylor, National Association of Boards of Pharmacy, *Secretary Treasurer*, W Paul Briggs dean of the School of Pharmacy, George Washington University Washington, *National Councillor* in the Chamber of Commerce of the United States, Samuel L Hilton, Washington

The executive committee of the conference is composed of one representative of each of the constituent associations, selected by the respective organizations

WHOLESALE DRUGGISTS CONFER WITH FEDERAL TRADE COMMISSION

More than three hundred representatives of the wholesale drug trade agreed in a trade practice conference held by the Federal Trade Commission in Chicago December 6th, that certain practices are the major causes of unfair and unethical competition in the industry and asked the Federal Trade Commission to adopt and enforce resolutions so defining these practices The trade urged the Commission to investigate the costs of wholesale distribution of drug merchandise, recommended the general adoption of accurate and standard methods of cost finding to foster intelligent and fair competition, and sought the distribution among members of the trade of information covering delinquent and slow credit accounts—all with the sanction of the commission

The meeting was attended by Charles H March and George McCorkle, of the Federal Trade Commission

The proposed resolutions provoked very little discussion, all but two or three being adopted unanimously Under the usual procedure the Commission will consider the approved resolutions adopt those which it considers advisable and ask members of the industry to signify their intention of following them Subsequently the Commission will apply and administer the rules The Chicago conference was called by the Federal Trade Commission on the application of the National Wholesale Druggists' Association which went on record at its last annual convention in favor of such a meeting

Trade practices were considered in two groups—Group I, Illegal, Group II, Not Illegal but should be observed In the first false advertising, defamation of competitors selling below cost to injure competitor, secret remuneration, secret payment or allowance, refunds, altering trade marked merchandise to deceive acceptance of orders and making smaller deliveries at quantity price, misrepresenting as wholesaler imitation of trade marks, fictitious prices, threats of suit for intimidation, substitution misleading price lists, create monopoly, free transportation, special price misrepresentation, unreasonable discounts, coercing purchases, interference with competitors' rights These statements are to be considered in connection with deception, and also the practices of Group II

The following committee was selected to cooperate with the Federal Trade Commission and to perform such acts as are proper to put into effect the rules adopted A Kiefer Mayer, Indianapolis, George V Doerr, Minneapolis, Warner James, Inc, Brooklyn N Y, O J Cloughly, St Louis, and Ira J Shapero, New York

Dr E L Newcomb was unanimously elected secretary of the conference Col Charles H March, member of the Federal Trade Commission addressed the conference on "Origin and Powers of the Commission"

F W D A PLANS CAMPAIGN OF EXTENSION

Executives of the cooperative wholesale houses composing the Federal Wholesale Druggists' Association met in Chicago for special deliberations December 5th and 6th The chief topic of discussion, according to R E Lee Williamson, secretary of the Association, was extension of the coöperative plan, and steps were taken toward explaining the plan to retail

druggists in sections where there are now no cooperative organizations "Flexibility of the operating plans of the cooperative houses," Mr Williamson said, 'made it possible for them to report at the meeting that none had had a loss over the past four years, in spite of their sharing in the general lessening of business" The Association will hold its Winter meeting in New York some time before March 10th

DRUG INSTITUTE OF AMERICA

Endorsement of its past activities and the proposal of a budget that will assure continuance of a very definite predetermined program were the outstanding actions taken at the Annual Meeting of the Drug Institute, Inc, at its headquarters in New York City on December the 12th

---

Retail druggists will come face to face with their responsibilities under price stabilization plans during the coming year according to plans outlined at the annual meeting of Drug Institute of America, in New York City, December 12th The Institute intends to send two men out in the field to set up committees in every urban community to disseminate information relative to developments in the industry along lines of stabilization The meeting was attended by thirty four members

Ten members of the board of directors whose terms expired this year were reelected and seven members were elected to fill vacancies or newly created openings The directors who were reëlected were as follows Charles J Lynn, Dr W E Weiss, J L Johnston, Ralph Aronson George V Doerr, Harry Z Krupp, John W Dargavel, C Fred Michaels, H H Miller and Wheeler Sammons Henry W Bristol, John H Johnson, Charles A Peacock and B E Levy, were elected to fill vacancies C W Kress, Fred Griffiths, Dr E L Newcomb Dean C E Caspari and Dean H V Arny were elected to fill new positions on the board Officers of the Institute will be elected at a meeting of the board December 19th

NATIONAL ASSOCIATION OF RETAIL DRUGGISTS

Cincinnati was selected as the 1935 N A R D convention city by the members of the Executive Committee *Chairman*, Charles Ehlers Cincinnati, C Fred Wright, Boston, George L Secord, Chicago, John Witty, Portland, Ore, Thomas S Smith, Wilmington, Delaware, Monte L Powell, Denver, and President Harvey A Henry, Los Angeles

A PH A AND N A R D COMMITTEE DISCUSSES COOPERATION

The joint committee representing the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists, in a meeting held in Washington, December 5th considered at length various suggestions that have been presented looking to a consolidation or affiliation of the two national associations and also to the closer federation of State pharmaceutical associations with the two national associations The proposal for consolidation was disposed of for the present by a formal resolution adopted by the National Association of Retail Druggists at its recent annual meeting in New Orleans The proposal for some form of affiliation between the associations did not appear to the committee to be practical under existing conditions, and in view of the apparent need for separate organizations to deal with the professional and the economic problems of pharmacy

The members of the joint committee are Robert P Fischelis, E F Kelly and R L Swain, representing the AMERICAN PHARMACEUTICAL ASSOCIATION, and John W Dargavel, Charles Ehlers and Thomas S Smith, representing the National Association of Retail Druggists

FEDERATION OF EASTERN STATES PHARMACEUTICAL ASSOCIATIONS

The by-laws provide that the purpose of this federation shall be to promote and advance the economic and professional interests of Pharmacy and to cooperate with the A PH A and the N A R D in problems of national interest

At present the membership is composed of the associations of the following states Massachusetts, Connecticut Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia A council is created of representatives from constituent members Other articles deal with officers and duties Two meetings are provided for, May and November, and special meetings may be called by the executive committee

STATE ASSOCIATION MEETINGS

[illegible] Pharmaceutical Association meets [illegible] June 18th–20th

[illegible] Pharmaceutical Association meets in [illegible] May 14th–16th

[illegible] Pharmaceutical Association meets [illegible] June 18th–20th

Vermont Pharmaceutical Association meets [illegible] Mount Mansfield Inn Fairlee, June 16th–18th

Florida Board of Pharmacy will meet in Jacksonville January 7th, applications should be filed with Secretary J H Haughton, Palatka Fla

Tennessee Board of Pharmacy will meet in Nashville January 15, applications should be in the hands of Secretary J B Sand South Nashville, by January 1

ARIZONA PHARMACEUTICAL ASSOCIATION

The annual meeting of Arizona Pharmaceutical Association was held in Phoenix, November 22nd–24th A large representation of its members was in attendance L N Brunswig, Frank E Mortenson, secretary of Southern California Pharmaceutical Association, were among the visitors Secretary H C Christensen, of the N A B P, was present to assist in the final draft of a proposed new Pharmacy Law and as a representative of the AMERICAN PHARMACEUTICAL ASSOCIATION President Harvey A Henry, of the N A R D, was one of the speakers of the convention, First Vice President, Ludwig A Schiff, N W D A, was a representative of that organization

ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS

To commemorate its fiftieth anniversary the Association of Official Agricultural Chemists has issued as No 4 of its current volume of the *Journal of the Association of Official Agricultural Chemists* a fifty year index of its publications This index includes all entries from the Proceedings published in the Department of Agriculture *bulletins*, the journal of the Association, and in the 1920 1925 and 1930 editions of the 'Book of Methods' The Association plans to issue a supplementary index each ten years covering subsequent work

LEGAL AND LEGISLATIVE

NARCOTIC EVIL

No class of citizens is more seriously concerned and desirous of destroying illegal traffic in narcotics than are druggists and pharmacists There are probably no more needful and useful drugs than narcotics but, unfortunately, there is no greater evil than misuse of them Pharmacists have a responsibility and it is gratifying to know that they as a class, discharge their duty in connection therewith A part of an editorial of the *Washington Evening Star* is quoted

"Both as an evil in itself and as a causative of other evils the traffic in narcotics has become one of the gravest menaces to social stability in this country It affects the moral and physical health of those addicted to the drug habit and it leads to all forms of dishonesty in the maintenance of the business of purveying the materials By a pernicious sequence those who are engaged in the traffic seek to enlarge the field by corrupting the young Themselves in most cases addicted to the use of drugs, the vendors ply their trade without conscience or restraint to gain means to secure the materials which in their depraved condition they crave To break this vicious circle of combined cause and effect is a task of great magnitude"

PHARMACEUTICAL AND BIOLOGICAL INDUSTRY

The following members have been appointed members of the code authorities of the Pharmaceutical and Biological Industry Carl N Angst, Pitman Moore Co, Indianapolis, Ind, Horace W Bigelow, Parke Davis & Co, Detroit, Clifford V Haver, Haver Glover Laboratories, Kansas City, Mo, John G Searle, G D Searle & Co, Chicago, A Homer Smith, Sharp & Dohme, Philadelphia

RULES PRESCRIBED FOR HANDI CODE AUTHORITY FUNDS

The National Industrial Rec[illegible] issued regulations, December 7th, be followed by all code authoriti[illegible] money collected for code admini[illegible] prescribed rules call for a bon[illegible] all money collected, separatio[illegible] thority funds from all others, [illegible] and adequate accounting rec[illegible] inspection by the NRA, peric[illegible]

Administration, audits by independent accountants at the end of each budget period, and submission of financial reports to all contributors to code funds within 60 days after the budget closing date These regulations provide that each such code authority must furnish adequate information regarding observance of the rules and any action of a code authority is subject to NRA disapproval if found that it is not in accord with the order The order further defines the term 'competent, independent auditor" who is to conduct the audit at the end of each budgetary period

SCRIP" PROVISIONS OF RETAIL CODES ARE STAYED UNTIL JANUARY 6, 1935

Provisions of various retail codes which prohibit the acceptance of ' scrip" in payment for goods have been stayed until January 6, 1935, under an order announced to day by the National Industrial Recovery Board

The codes affected are those for the retail trade the retail jewelry trade and the retail food and grocery trade, together with any other code or codes" in which similar provisions may exist

The stay was ordered to permit additional time in which the National Industrial Recovery Board may study a report submitted on October 22nd by a special committee which investigated so called 'company" stores and the scrip system of wage payments generally

In its report, the special committee submitted recommendations relating specifically to Article IX Section 4 of the retail code as approved on October 21, 1933, which would eliminate that Article and substitute the following provisions

' No company store or retail store shall collect by offset in the form of scrip, book credit or otherwise against the wages of any person other than its own employees engaged exclusively in the retail trade, an amount for merchandise sold by said store in excess of 25 per cent of such pay earned in any pay period

No store shall purchase or receive or accept for cash or consideration in trade or in payment of indebtedness any scrip at less than its par on face value "

COSMETIC CODE AMENDED

Members of the perfume cosmetic and other toilet preparations industry, whose sales of these products during 1933 amounted to $5000 00 or less and represented 5 per cent or less of the total net sales of such members need not contribute to the support of the code authority for this industry, the NRA has decided The order is in the form of an amendment to an earlier order terminating the exemption from paying fees to this code authority, which had been granted manufacturers the bulk of whose products were produced under some other code

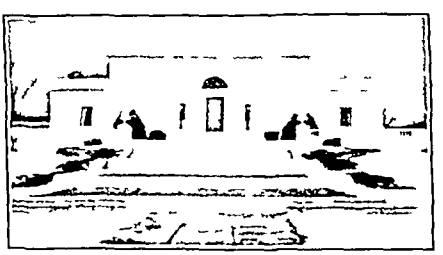
RETAIL DRUG CODE AUTHORITY OF THE DISTRICT OF COLUMBIA

The Retail Drug Code Authority of the District of Columbia has sent out a questionnaire asking for information as follows

Should NIRA be continued after June 1935? Is collective bargaining of any importance to you? Has the Drug Code been of value to the trade? Has reemployment increased? Have wages been increased? Have trade practices improved? Should the Drug Code be continued? Should some other form of business control replace the Code? Should retailers in towns of less than 2500 population be exempted? Are the provisions governing hours of labor satisfactory? Should they be increased? Should they be decreased? Are the minimum wages satisfactory? Should they be increased? Should they be decreased? Should the present Loss Limitation Provision be continued? Are the other trade practice provisions satisfactory? What change should be made in the Code?

OPTIONAL DISCLOSURE OF FORMULAS IN CANADA

The Pharmaceutical Journal states that an amendment to the Canadian Pure Food and Drugs Regulations requires on labels of medicinal preparations a quantitative statement of ingredients and recommended dosage. This is not required if the drugs conform to the recognized standards prescribed under Section 6 of the Canadian Food and Drugs Act, nor if sold under a registration number assigned under the Proprietary or Patent Medicine Act



The American Institute of Pharmacy First snow in Washington, December 1934 —*Courtesy of S L Hilton*

HARRY C CARR TO HEAD NRA DISTRIBUTING TRADE DIVISION

The National Industrial Recovery Board December 7th, announced the appointment of Harry C Carr as Acting Division Administrator of the Distributing Trades Division to succeed Robert L Houston, who resigned recently

Mr Carr was Deputy Administrator in charge of the retail section of the Distributing Trades Division

Before coming to NRA, Mr Carr was managing director of the European Marketing Subsidiary Companies of the Gulf Oil Corporation 1928–1932, assistant to the president and export manager of the Sun Oil Company 1915–1928, and manager of the Railway Supply Department of the Simmons Hardware Company, 1911–1914

He was born in St Louis and is a graduate of Columbia University

BOOK NOTICES AND REVIEWS

Accepted Dental Remedies published by the Council on Dental Therapeutics of the American Dental Association, 212 E Superior Street, Chicago, Illinois Revised annually 204 pages Price $1 00

The purpose of the book is to give information to protect the dental profession in the prescribing and the use of proprietary medicines, to list accepted proprietary articles and analogous official preparations so that the dentist may have a complete list of drugs and preparations from which to choose

It lists and describes non official drugs as well as those selected from the U S P and N F It contains a bibliography and index to proprietary and nonofficial articles not accepted by the council Rules governing the admission of proprietary articles to the list of "Accepted Dental Remedies' are outlined in detail They cover such subject matter as composition of article, identification direct advertising, indirect advertising false claims as to origin, unwarranted therapeutic claims, poisonous substances, objectionable names, products with protected names, unscientific and useless articles Explanation of the Council's interpretation of the rules is clearly set forth so that the manufacturer pharmacist and dentist may have a very workable knowledge of the intent of the Council on Dental Therapeutics and the regulations governing the acceptance of a product

Attention is brought to rules governing the use of the Seal of the Council stating how it is to be used size of Seal and conditions governing the time period for its use

The therapeutic index lists the following classification Corrosives or caustics, astringents, styptics, disinfectants, germicides and antiseptics, local anodynes and analgesics, local anesthetics, dehydrating agents for tooth structure, emollients and protectives, drugs used against oral amœba drugs of dental interest used for infections of the alimentary tract, for effect on circulation, respiratory and central nervous systems and to reduce fever as well as those used for their effect in the blood, that is, to increase the hemoglobin and increase coagulability

Definitions for official pharmaceutical preparations are stated so that the dentist may find it convenient to make a choice of the proper type of medication to administer Tables of poisons and their treatment as well as ones for solubility, weights and measures are enumerated

Accepted Dental Remedies represents a wealth of valuable information for those who have use for such a concise well written publication It should not only be in the office of every practicing dentist in this county but also in every prescription pharmacy It has a very definite place in dentistry comparable to that in medicine of the New and Non official Remedies of the American Medical Association —GEORGE C SCHICKS

We are in receipt of the following reprints, through the courtesy of Dr C A Browne, Chief, Chemical and Technological Research, U S Department of Agriculture

Scientific Notes from the Books and Letters of John Winthrop, Jr ," reprint from *Isis*, December 1928

"An Old Colonial Manuscript Volume Relating to Alchemy," reprinted from *Journal of Chemical Education*, December 1928 Both of the foregoing reprints were made use of by Dr Browne in his discussion at the meeting of the Society for the History of Science held at the American Institute of Pharmacy on November 7th

INDEX TO AUTHORS

(Some reports, etc , are not listed in Authors' Index, but will be found in the Subject Index under reports, abstracts, personal items, etc)

The Foyer and Alcove of the American Institute of Pharmacy, Washington, D C AMERICAN PHARMACEUTICAL ASSOCIATION

INDEX TO SUBJECTS

(See Authors' Index for titles of papers, also for titles in this (Subject Index))

B

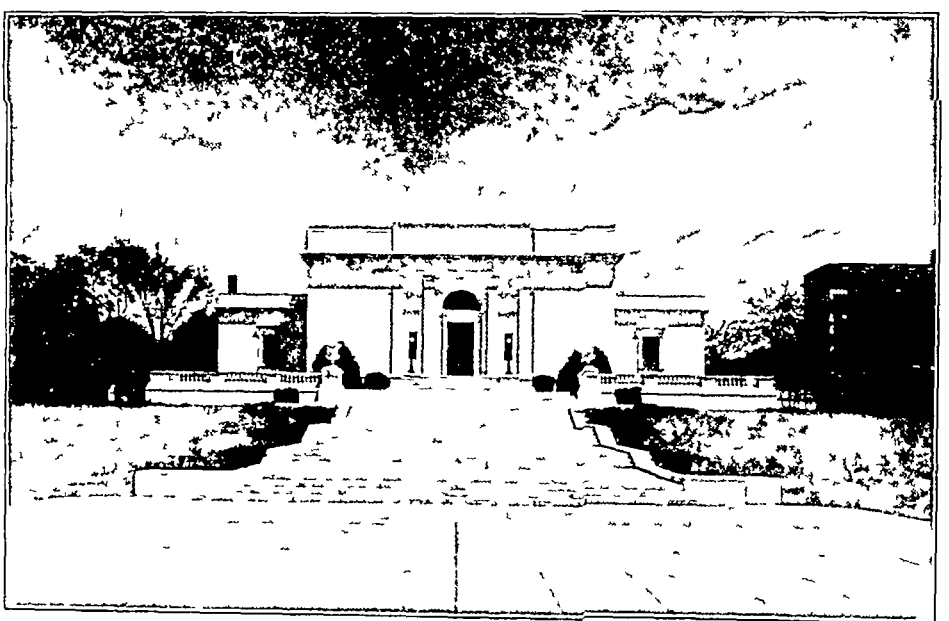
I

J

K

L

If item is not found under heading searched for in Authors or Subject Index, please refer to Branches Conferences, Discussions, Minutes of foregoing, Council, Discussions, General Sessions, House of Delegates Reports, Committees Sections, etc



American Institute of Pharmacy, dedicated May 9, 1934, AMERICAN PHARMACEUTICAL ASSOCIATION